AMERICAN GAS

Association

MONTHLY

PRIL 1948 • VOL. 30 · NO. 4

I do if he promises to buy me a new AUTOMATIC GAS RANGE built to "CP" standards.
MACKENZIE
"CP" is a trademark of the Gas Appliance Manufacturers Association
YES, a new AUTOMATIC Gas Range, built by any one of 19 leading manufacturers to "CP" standards, is one answer to a happy married life. For whatever "make" or model you choose, if it carries the "CP" seal of the Gas Appliance Manufacturers Association, you get the world's finest cooking *fuel* combined with a range specifically designed to give you the world's best cooking *results*. For faster, finer, fully automatic cooking—order a new AUTOMATIC GAS RANGE today
WHAT YOU WANT... THE NEW GAS RANGES HAVE!
√ Automatic lighting
√ Automatic heat control
√ Automatic clock control
√ Instant high-heat
√ Instant shut-off
√ Smokeless broiling
√ Non-clog burners
√ Streamlined design
√ Full-size separate broiler
√ Extra-insulated oven
√ Thrifty-simmer burners
YOUR NAME HERE

SHOWN above is one of a novel new series of newspaper advertisement mats sponsored by the Gas Appliance Manufacturers Association as a flexible tie-in with the gas industry's Gas Has Got It campaign. Adapted to "CP" advertising by A. W. MacKenzie, one of the foremost newspaper cartoonists, the mats employ a strikingly effective technique to supplement gas company local advertising and draw highest attention and visibility among newspaper readers. Also shown are five cartoons from advertisements in the series. Bold in treatment and humorous in situation, these mats adapt themselves to whatever local theme is desired. In addition, minimum "CP" copy for each advertisement will be supplied in mimeograph form for local newspapers to set.

A SPRING of furious activity has arrived for the gas industry, heralded by sales conferences in Pittsburgh and Windsor, Ontario, and the New England Gas Association's annual meeting in Boston—important forerunners of many national and regional activities to come. . . . George Uhlmeyer's paper in this issue shows that it is time to secure and retain the industrial gas heating load. . . . Critics who periodically predict an early demise for the natural gas industry are confronted herein with the fact that the nation's estimated natural gas reserves actually have increased during the past year. . . . A third step is reported in the manufactured gas industry's research on catalytic reforming of hydrocarbons for use in production of peak load gas. . . . Plans have been completed for a nationwide campaign to expand the market for automatic gas water heaters. . . . Recognizing the fundamental role which steel supplies, marketing research and statistical analysis will play in gas industry expansion plans, the Association has organized a Gas Utility Steel Requirements Committee and a Committee on Economics. . . . Meanwhile, there looms on the horizon the annual October convention which, on the basis of early plans and interest should provide a record breaking finish to another year of significant progress.

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Tomorrow's Sales Opportunities

By H. H. CUTHRELL

Chairman, Promotional Planning Committee
American Gas Association

THE gas industry, both natural and manufactured, stands at a crossroads, or rather, stands at a fork in the roads. Down one road lies the way to a business that is ever-expanding and which is rendering greater and greater service to its customers. Down the other road lies the path to a quiet and lingering demise for the venerable gas industry. I'm sure it's obvious that the first path is the one of action and the other the road of inactivity.

Let me add for those who have an interest in the gas appliance business—the life blood of our industry—"the honeymoon is over." Or, if it's not quite over, at least the young bride is beginning to snap a little at her ever-loving spouse. The economy of scarcity that has existed ever since the war is one of those "once-in-a-lifetime" phenomena that I think we'll be well rid of. Just because "the honeymoon is over," I see no cause for us to be discouraged. In a good marriage, when "the honeymoon is over," the best part lies ahead, the part that has to be worked at, struggled through and lived for, but nevertheless the part that brings the greatest inner satisfaction and outward accomplishment.

Before contemplating tomorrow's sales opportunities, let's look around and see what has caused this unusual market in which we have revelled, where buyers were more plentiful than appliances.

In the first place, there is more money in circulation today than ever before and by "in circulation," I mean that, even though the last few months have shown a trend reversal, men and women still have more bonds, more savings bank accounts, more life insurance, and more cash than they ever had before the war.

In the second place, there is a terrific housing shortage which is not local but nation-wide. It indicates a solid five or ten-year demand for new home appliances.

Third, the war years built up a tremendous backlog of appliance demand from people who have set up new homes and to replace millions of obsolete gas appliances.

In the fourth place, we have a fuel and appliances to use that fuel, which we know have been improving to the point where they satisfy the customers' desires in major part.

Last in the major causes which have indicated immediate prosperity is the fact that the gas appliance supply situation has been steadily improving.

Now, if we were to stop right here, we could say that the future is "rosy." But as we all know, there are other factors involved.

In the first place, we are not the only ones who are determined to capitalize on the vast potential buying power which exists. If you want to do some small-scale worrying, you can look at your own immediate competition which is already unfolding. Sales of electric water heaters alone in 1947 jumped to 1,100,000 against our own sales of 1,800,000—a ratio too close for comfort—and expanded electric water heater production is planned for 1948.

Perhaps you'll say that those heaters are going in localities without gas service. Maybe some of them are, but one large manufacturer of electrical equipment has doubled his prewar promotion budget to $5 million, with emphasis to be placed on ranges, water heaters, and dishwashers—so we had better all look sharp. The fact that Westinghouse and General Electric have cut refrigerator prices is still another omen.

An analysis of water heater advertising which appeared in women's publications in 1947, reveals expenditures for space alone by manufacturers of electric water heaters totalling $239,348. Expenditures by manufacturers of gas water heaters totalled $128,214, and manufacturers making both types of heaters spent $354,685.

An examination of a March issue of just one of the many

Presented March 18, 1948 at annual meeting, New England Gas Association, Boston, Massachusetts.

← View of mains from Calumet compressor house to gas coolers, with large waterless gas holder in background. Picture by William Beuke, The Peoples Gas Light & Coke Co., Chicago.

women's magazine showed a total of six water heater ads, four by electric manufacturers and two by combination manufacturers, with none devoted exclusively to gas or over the signature of manufacturers who make only gas water heaters.

If you are prepared to worry on a large scale, you need merely recall the predictions you yourself have undoubtedly read as to the plans of others who want a major share of the market. You can include in these "snatchers at the customer's dollar" the automobile salesmen, the builders of new homes, the suppliers of home furnishings or the manufacturers of women's clothing who in one fell-swoop obsoleted all women's clothing in order that they might get a major share of family savings. Add also the makers of automatic washing machines and other household appliances and consider too the lure of a long-postponed vacation to faraway and interesting places plus the inevitable urge to keep some money for savings as a nest egg against the future.

That's quite a challenge, isn't it? But the challenge doesn't worry me as much as our own mental and physical readiness to tackle the problem. I find it very upsetting to reach the conclusion, as I must, that the gas industry is not ready. We are not ready mentally and we are not ready with manpower.

Perhaps you wonder what makes me say this. Well it's items like this:

1. At a refrigeration committee meeting it was the concensus of opinion that over the country as a whole gas appliance sales forces had only 30 percent of their pre-war manpower.
2. There are many gas companies who have no salesmen at all.
3. Some gas companies are still paying salesmen straight salaries with no commissions—in other words, these men have no incentive.
4. Most gas companies have made no effort to recruit bright young men into the business. Men who are to be the gas appliance sales managers of tomorrow.
5. Few, if any, companies have started to educate or train non-selling employees to help their sales staffs.

The bright ray of hope is that these are not problems we can't handle if we start now.

I read somewhere recently of an inventor in Oregon who perfected a device which signals the driver of a car with a buzzer when a tire becomes dangerously deflated. I think our appliance sales business, whether we do it ourselves or whether dealers do it for us, is like that deflated tire. It's at a danger point. And I'd like to hope that these words will be a warning buzzer to all of us.

Let's change that old saying, "Physician, heal thyself," and change it to, "Salesman, sell thyself." Look your product right in the eye and sell yourself.

With automatic clock controlled "CP" gas ranges, modern automatic gas storage water heaters, the streamlined gas refrigerator, and the best house heating equipment on the market today, can

H. H. Cuthrell, vice-president, The Brooklyn Union Gas Co., and second vice-president, A. G. A.

there be any doubt in your mind that you have a product that will sell? The answer is "No!" So let's assume that you have sold yourself.

Now I don't care what product you are selling, gadgets or gas ranges, they're not going to walk out by themselves and move into the customer's home—it takes manpower to move merchandise. First you have got to sell this fact to the management of your own company. Tell yourself and your management that, as this sellers' market ends, you have got to have manpower that is competently and adequately trained to attach the gas load that's going to make or break the future. And when we have our manpower let's take further stock of our resources.

Men of distinction are not always the most handsome nor are women who achieve the pinnacle of success all former beauty queens. Their success lies in capitalizing on the talents which are inherent in them. We in the gas industry have never enjoyed the luxury of being able to spend money without careful planning, or in quantities that would do the kind of job we would like. This is as true now as it always has been; but we *can* find out where our strength lies and proceed from there. As a start we can gather a great measure of comfort from the revelations of the Elmo Roper survey.

When women say they want their refrigerators to be conveniently arranged, quiet and inexpensive to maintain, we realize that "what women want, GAS has got."

When women say the most desired features in house heating are ease of operation, cleanliness, best all-around comfort and economy, we see again that "GAS has got it."

In water heating, we find that automatic operation, adequate supply of hot water, speed, cleanliness, low operating cost, and low cost to buy are what is wanted.

The basis for our present national advertising on automatic gas ranges built to "CP" standards came from the revelations of this survey.

In commenting on it, the chairman of the Gas Appliance Manufacturers Association's "CP" group said, "The gas industry is putting its best foot forward in presenting to its customers the type of cooking equipment which rightfully interprets gas as a fuel for cooking and which effectively meets competition."

We certainly can't afford to forget that the best defense is still a strong offense.

Several years ago it was realized that the strength of the gas industry lay in its ability to coordinate its efforts to secure maximum results, with the relatively small amount of money available for promotional activities. F. M. Banks' Committee in its report entitled, "Recommendations Regarding Future Promotional Advertising and Research Activities of the Gas Industry" said in part, "We propose that a General Promotional Planning Committee be set up, and that it have the enlarged responsibility for the general planning and integration of all promotional activities of the Association, its member companies and manufacturers."

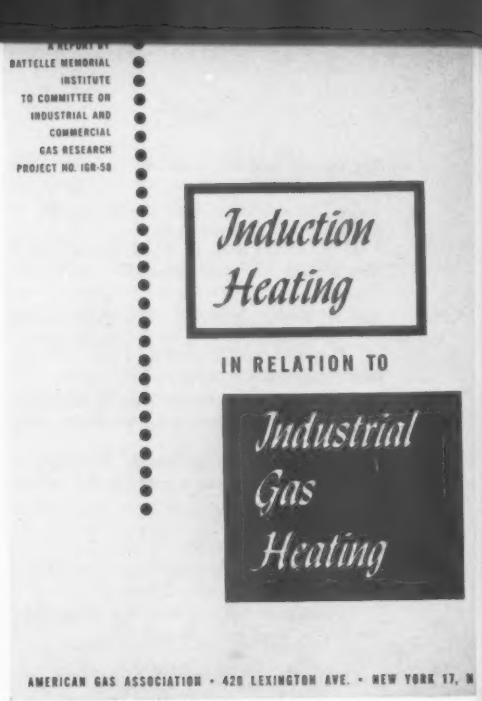
In that com- *(Continued on page 47)*

It's Time to Act on Industrial Gas Heating

Report on A. G. A. project shows high speed gas heating process must be further developed and promoted to its fullest extent

By GEORGE A. UHLMEYER

Iowa-Illinois Gas and Electric Co., Rock Island, Ill.



● A vitally important engineering and economic comparison of gas and induction heating, recently completed for the American Gas Association by Battelle Memorial Institute, enables the intelligent prediction of future trends in the industrial heating field, and suggests measures which should be planned in order to secure and retain the part of that heating load which properly belongs to gas.

Known as "The Investigation of Induction Heating in Relation to Industrial Gas Heating," the study was sponsored by the A. G. A. Committee on Industrial and Commercial Gas Research, with George A. Uhlmeyer, manager, industrial sales department, Iowa-Illinois Gas & Electric Co., Rock Island, Ill., and D. W. Chapman, manager, industrial sales, The Peoples Gas Light & Coke Co., Chicago, Ill., as committee technical advisors of this research project. Ralph L. Manier, industrial heating engineer, Central New York Power Corp., Syracuse, N. Y., is committee chairman.

Mr. Uhlmeyer, speaking April 7 at the 1948 A. G. A. Sales Conference on Industrial and Commercial Gas in Windsor, Ontario, presented a comprehensive review of the Battelle report. At the same time, S. L. Case, who directed the work at Battelle Memorial Institute, discussed some of the major points involved.

"The Battelle survey concludes," Mr. Case stated, "that on the basis of economic and engineering factors involved, modern gas-fired furnaces should be able to hold either an exclusive or at least a dominant position in the field of homogeneous heat treatments, such as through hardening, annealing, or normalizing of castings, shapes, or bars; bright annealing of strip and wire; normalizing of strip and wire; spheroidization treatments, etc.

"Surface hardening, as well as heating for forging and hot working, and brazing operations will be a field where direct gas heating will compete with induction heating, and in this field which involves a potential tonnage of ten million tons of steel yearly, direct gas heating has a very bright future, if the choice of heating methods is intelligently made on the basis of economic and engineering factors. . . .

He described the history of induction heating as "an interesting example of successful exploitation of an idea which has lain dormant for many years and then mushroomed from a toy into an industrial giant. . . .

"The history of this process," he continued, "can be traced to Michael Faraday when he discovered the principle of the transformer in 1831, because an induction heating unit is a transformer in which the heating coil is the primary and the metallic charge is the secondary of the transformer. . . .

"During the 16 years from 1916 to 1932, only 37,000 kw. capacity of induction heating equipment was put in use throughout the world. During the next four years, the capacity was doubled and continued to double every four years. While at present, existing installations can serve only about ten percent of the needs of the industry for heat treating and forging, by 1960, if the indicated rate of growth were to continue, induction heating would absorb more than 80 percent of the potential market."

Below is Mr. Uhlmeyer's review of the Battelle report "Induction Heating in Relation to Industrial Gas Heating" (price one dollar).

G. A. Uhlmeyer

S. L. Case

As all industrial gas engineers are aware, the gas industry has worked long and hard, through its industrial departments, to build up the large industrial loads now connected to our systems and to secure the highest degree of acceptance for gas as the ideal industrial fuel. As a consequence, we have viewed with some concern the ever increasing amounts of present and potential gas loads being replaced by induction heating.

The questions most frequently raised regarding this situation are: How much of existing industrial loads are we going to lose? Are we going to be able to secure new loads in the face of this new competition? How are we to combat induction heating inroads? What should we as an industry do to strengthen our position?

Most of us have seen the induction heating process in operation and have been impressed with the speed, cleanliness, push-button control, and quality of work produced by this entirely new heating method. Is it any wonder then that our customers are turning more and and more to induction heating? There are many who view this trend as the greatest threat to the continued use of gas for industrial heating that has ever confronted the industry.

It is quite obvious that in order for a comparatively new process to gain as great an acceptance as has induction heating, that such a process must necessarily have fundamental advantages not possessed by the older conventional heating methods. A study of the induction heating process reveals the following advantages or claims:

A. It increases speed of heating and therefore increases rate of production.

B. It has the ability to control the heating pattern and depth of hardness in the part be-

ing heated, and improves the physical properties of work treated.

C. The induction heating unit can be installed in the production line.

D. It makes possible a substantial reduction in both the number and skill of the operators.

E. It greatly improves working conditions.

F. Induction heating results in the practical elimination of distortion, scale formation, and decarburization of the parts heated.

G. It makes possible in many cases, substitution of plain carbon steel for more costly alloy steel.

H. It makes possible finished machining of work parts before heat treatment, and reduces machining costs.

I. It eliminates, in many instances, the time consuming carburizing processes, costly furnaces, and auxiliary equipment and also in many instances conserves floor space.

J. Induction heating at times reduces inventory of work parts in process.

Other factors have also contributed to the rapid growth and acceptance of induction heating. The electrical industry has contributed greatly to the research, advertising and market development of the process. In addition, production requirements imposed by World War II resulted in an abnormal increase of induction heating installations that probably would not have occurred under normal conditions.

Development Needed

The only apparent hope for stemming this tide of increasing competition appeared to be the immediate exploration and further development of the high speed gas heating technique. This process was known to possess to a large degree the advantages enumerated herein for induction heating. In addition, high speed gas heating has substantial economies in operation not possessed by induction heating.

High speed gas heating, which is a much more recent development than induction heating, has been developed during the past five years so that its performance and economy have in many cases made it a choice over induction heating. High speed gas heating is not generally accepted by industry, however, because of the fact that it is new and relatively little technical information is available regarding either the process or the properties of the work treated.

Before the gas industry could undertake a program to fully develop the potentialties of high speed gas heating, it had first to determine the status of each process. The Committee on Industrial and Commercial Gas Research, American Gas Association, took cognizance of this situation, and is taking steps to find a solution to the problem. The committee decided that before management in the gas industry would approve the expenditure of large sums of money for research, it would first be necessary to obtain an unbiased authoritative report of induction heating and high speed gas heating processes. This study would cover the engineering, metallurgical, and economic phases of both processes to the extent necessary to enable the investigators to advise the gas industry with respect to:

1. The types of gas loads which are being displaced by induction heating (not including metal melting).

2. The inherent advantages and disadvantages of each heating process.

3. The comparative economics of each process. This covers first, direct processing costs; second, economies that result from change in the specifications or type of steel that could be used; and third, change in heating methods and procedures.

4. The research work that should be carried on in order that gas secure its share of new markets.

Early in 1947 Battelle Memorial Institute, Columbus, O., was assigned the job of making such a study by the A. G. A. Industrial and Commercial Research Gas Committee. Battelle assigned this study to its staff headed by S. L. Case, assisted by L. R. Jackson and R. J. Lund. Conferences were held with the manufacturers of both induction and high speed gas heating equipment, all available literature and operating data were carefully reviewed, representative operating installations were inspected and the opinions of operating personnel and management were tabulated. From these data a comprehensive report has been prepared—"Induction Heating in Relation to Industrial Gas Heating."

The report contains the following conclusions: During the past ten years or more, induction heating has in one sense displaced conventional gas furnace heating. However, this displacement did not, except in few instances, involve actual physical removal of gas equipment. Rather, induction heating absorbed a disproportionate share of new markets.

Heating operations such as bright annealing, normalizing, spheroidizing and through hardening show no substantial improvement in economy or quality of product when done with induction heating or high speed gas heating. Therefore, these operations will probably continue to be done with conventional gas furnace equipment.

Drawing or tempering operations will still be necessary regardless of any change that might be made in the method of surface hardening. Where this operation is now being done with gas, such loads will not be disturbed.

Survey Reveals

The survey reveals further that other heat treating, forging and hot working operations now being done with either conventional or controlled atmosphere gas fired furnaces, could go to induction heating within the next few years. Included with this list is production brazing which is headed directly to induction. That is, unless these loads can be saved for gas by the immediate action of our industry to do something about it.

It should be noted that in addition to the loss of much gas load that may go to induction heating directly, the gas industry also stands to lose a great part of the gas consumption now being sold for the operation of carburizing furnaces. This load will likely be lost whenever the heat treatment of the core of the work piece is not necessary. The carburizing process will be abandoned in such cases and will be superseded by direct hardening methods.

It is obvious from the conclusions that have been reached that if the gas industry is to retain its share of these industrial heating loads, the high speed gas heating process must immediately be further developed and promoted to its fullest extent. Its merits must be publicized so that industry will accept it at least to the same extent it has accepted induction heating.

To date, Selas Corp. of America, and a few other manufacturers have done most of the pioneering work on high speed gas heating. In view of the limited funds and personnel at their disposal, they have done a remarkable job to bring this development to its present state of acceptance.

Many gas men have seen the recent advertisement appearing in *Industrial Gas Magazine* reporting on Selas Corporation "gradiation" process that is now being used successfully for heat

processing of metals, ceramics, glass, printed material, chemicals, food products and textiles.

The gas industry owes a real debt of gratitude to these manufacturers who have pioneered the development of high speed gas equipment. They have done this job so well that the gas industry will, with the cooperation of all concerned, be enabled to retain its full share of the metals heating markets and maintain its position of leadership in this field. This conclusion is based on the report by Battelle which shows that high speed gas heating can compete with induction heating as follows:

A. It can equal the production rate of induction heating.

B. It will produce acceptable products (within the 0.125" hardness depth limitation). In some cases it has produced as acceptable job when induction failed.

C. The high speed gas heating unit which is essentially a machine tool, can be located in the production line.

D. It can be designed as a completely automatic production unit.

E. It reduces labor costs.

F. The direct gas heating unit greatly improves working conditions as compared to conventional furnace heating methods.

G. The high rate of heating reduces distortion, scale formation, and decarburization to a minimum.

H. High speed gas heating makes possible the substitution of plain carbon steels where costly alloy steels have been used previously.

I. Permits work parts to be machined before heat treatment and reduces machining costs.

J. It eliminates costly furnaces and auxiliary equipment required by the carburizing process.

K. It requires less floor space.

L. It reduces inventory of work parts in process.

M. In addition to all of the foregoing advantages which compare on equal terms with induction heating, the economics definitely favor high speed gas heating. The initial cost of equipment is lower and, even more important, the operating costs are substantially lower than for induction heating.

From the foregoing, the logical conclusion is drawn that there appears to be no technological factor that would retard high speed gas heating from securing its share of existing and potential markets. With the economics strongly favoring the gas process, and its ability to compete on equal terms in all other catagories it will be our own fault if we let this opportunity for advancement of our business slip from us. Such advances however, must be predicated on the assumption that technological advances in high speed gas equipment keep pace with those in induction heating equipment.

In order to take full advantage of the large market for high speed gas heating equipment that will result from a successful promotional program, it will be necessary for additional strong equipment manufacturers to get into this field. We are familiar with a number of cases where our customers have been very much interested in high speed gas heating equipment for specific jobs and were ready to install such equipment upon a reasonable delivery promise. However, due to the fact that the few manufacturers of such equipment were already overloaded with orders and did not have field engineers available, they were not able to follow up promptly on these inquiries. These potential gas customers became impatient and dissatisfied and installed induction heating. We may never regain such lost business.

This situation must be remedied. The only way that the gas industry can secure the full benefits from this potential market is to be able to supply the proper equipment when required by the customer. We urge therefore, that gas equipment manufacturers who have not interested themselves in the past in this field give immediate consideration to its potentialities for equipment sales, and that they give every possible assistance to the development of this market.

Printed copies of the Battelle report are now available to the gas industry and related industries. The report has been carefully reviewed by members of the Industrial and Commercial Gas Research Committee and by manufacturers of industrial heating equipment. The unanimous opinion has been very complimentary. The job has been well done. The report contains considerable information that has not been available heretofore and we strongly urge gas men to study it carefully and recommend it for reading by company management. We hope the report will serve to stimulate interest in high speed gas heating by equipment manufacturers who before have not actively participated in this field.

When we review the rapid growth of induction heating, we find the electrical industry has given its full support to the program through financing, development, and publicity. This program has been so effective that the public today regards induction heating as one of the glamorous and even romantic industrial developments of the age.

Compare this situation with the meager assistance that manufacturers have had from the gas industry in the development of high speed gas heating. It is little short of amazing that the process has made the advances that it has. If high speed gas heating is to secure the same degree of public acceptance as induction heating, a comparable promotion and publicity job must be planned. Papers must be given before technical groups, articles must be published in technical magazines, and national advertising programs must be presented telling the story of high speed gas heating. Only then will the advantages and economies of high speed gas heating be given full consideration by potential users.

The Battelle report concludes with recommendations for research that should be undertaken to promote the use and acceptance of high speed gas heating. Such research work is classified as *educational research* and *functional research.*

Educational research deals principally with the engineering, metallurgical, and economic features of the gas heating process. Such information when prop-

Pipeline Goes Through

Even the bitterest winter weather failed to halt construction on this 122-mile natural gas line of The Manufacturers Light and Heat Company

erly correlated and disseminated will assist materially in securing a better knowledge and understanding of the working and advantages of the new gas heating process. Under this classification it was felt that work should be started as soon as possible to make available the engineering and metallurgical aspects of high speed gas heating for which information is not now available. Here are several subjects specified in the report for which answers should be found:

1. How do steels of varying hardenability react to surface hardening by high speed gas heating methods compared with induction heating?
2. What are the thermal gradient curves for metals heated by the two processes?
3. What is the comparative residual stress distribution in surface hardened specimens?
4. To what degree and by what means can we control the surface temperature developed to avoid overheating?
5. What is the amount of decarburization that may occur when metals are heated by either process, and what is the effect such decarburization may have on the endurance strength of the metals so treated?
6. Is the present minimum hardness depth of 0.125 inch produced by high speed gas heating a disadvantage or an advantage? There appears to be good reason to believe that tests will prove that the greater depth of hardness will appreciably increase the endurance strength of the metal, therefore it could be a decided advantage.

The second type of research work classified as *functional research* deals primarily with improvement in the equipment or process so that high speed gas heating will do a better and more economical job than it is now doing. Under this classification the report suggests the following subjects be investigated:

1. The advantages that may be secured from the use of oxygen or oxygen enriched air instead of air alone as now used for the process. The higher flame temperatures produced by oxygen or oxygen enriched air mixtures should materially improve heating rates now obtainable. Higher heating rates should further reduce any tendency to distortion, decarburization, and scale formation. Higher flame temperatures would also permit a reduction in the present minimum surface hardness depth of 0.125 inch which would considerably increase the flexibility of the process.
2. Such modifications as may be necessary in existing burner equipment to accommodate the higher flame temperatures of oxygen or oxygen-air mixtures. The development of suitable ceramic or refractory burners to withstand these higher temperatures.

The committee has carefully reviewed the suggested research projects outlined in the Battelle report and recommends that they be undertaken as soon as the necessary arrangements can be worked out. The committee believes, however, that the following three *educational research projects* should be undertaken immediately because the information to be secured is very vital to the successful accomplishment of our high speed gas heating program:

1. Determination of the residual stress distribution in materials hardened by the high speed gas method.

(Continued on page 36)

Lone Star Advertising Uses "New Look"

A Mark of Distinction
in her clothes
in her kitchen
The smart woman of today dresses for her afternoon club meetings in a braid-accented box suit—cooks on a range with smooth-flowing lines reflecting the inspiration of modern design.
Hers is an automatic gas range built to "CP" standards.
In her range with streamline top, smartly styled handles and accessories is a galaxy of cooking refinements. It lights without matches, broils without preheating, wipes clean like a china dish. Even cooks meals while she's miles away.
Automatic gas ranges with the ideal combination of beauty and convenience in use are distinguished by the "CP" symbol.
Choose your "CP" range from the dozens of models now available in many different brands.
MAGIC CHEF automatic gas range built to "CP" standards with separate swing out, waist high broiler.
Suit selected by fashion authority and sketched in one of Southwest's women's fine apparel stores.
TAPPAN DELUXE automatic gas range built to "CP" standards with Vizulite oven.
TWO smart models of the many different brand automatic gas ranges built to "CP" standards available at gas appliance dealers' stores.
cp
see your gas appliance dealer
or Lone Star Gas Company

Gas Has Got It advertisements such as this offer eye-catching appeal for the "smart woman of today"

Nationwide Gas Water Heating Drive Launched

Campaign will organize sales forces and emphasize adequate sizing, upgrading of quality, and many domestic hot water uses

A NATIONWIDE campaign to expand the market for automatic gas water heaters has been launched by the Water Heating Committee, American Gas Association. Theme of the campaign, which is planned for the period beginning April 19, 1948, is "For Hot Water Magic—Gas Has Got It."

In an effort to stimulate a more selective attitude on the part of the buyer, the campaign will emphasize adequate sizing, upgrading of quality, and the many uses for hot water in the home. It will focus the attention of plumbers, appliance dealers, and utilities on the automatic water heater to an extent unmatched in recent years. A further objective is to organize effective sales forces and to train salesmen for the intensive period of competition now beginning.

A PAR ACTIVITY

The current activity is being prepared by A. G. A. and will serve as a "warm-up" for an all-out water heating campaign in 1949. The drive will be run by the individual gas utility which will support it with local advertising and sales contests.

Added force will be given the campaign by advertising and tie-in material of individual Gas Appliance Manufacturers Association members. These manufacturers have scheduled approximately $320,000 of national advertising for the second quarter of 1948 to be run in magazines with a total circulation of about 30 million. More advertising is planned for succeeding months.

A portfolio of water heating sales material directed mainly to the plumber and dealer will be supplied by A. G. A. prior to the start of the campaign on April 19. Contained in the folder will be suggested window displays, outdoor advertising, bill stuffers, handout pieces, and other sales clinchers and ideas helpful in creating prospects and closing sales. This material will be available through the Association or suppliers designated by A. G. A.

A novel feature for utility use is a ready-made sales contest, "The Magic City Election Campaign," containing suggestions which a local gas company can use intact or adopt as the basis for additional ideas which might be more appropriate in certain areas.

Gas company executives will receive a special folder showing ways to use the portfolio and containing a home service kit, miscellaneous ideas for home service tie-ins, radio announcements, publicity items, the "Magic City Election Contest," newspaper advertising, and other sales tools.

While this package campaign will probably begin on April 19, it is so designed that the theme and material are suitable for use any time in 1948 or even 1949. Some companies have indicated they will start in April while others will begin in May or June.

This cover from portfolio of water heating sales material stresses slogan of the nationwide effort

It is planned to keep the interest in the slogan alive throughout 1948 as a forerunner to the 1949 campaign.

Need for the campaign is accented by the fact that last year's production of automatic gas water heaters reached a record total of 1,800,000 units and present capacity is three times the pre-war volume. The 1948 campaign not only will be helpful in creating a market for this enlarged production but will also serve to help train a cohesive sales force for the days ahead.

Sales promotional material from A. G. A. portfolio showing mats available in gas water heating drive

Improving Commercial Coffee Urns

Well-established design principles should be applied to effect an improvement in coffee urn design and operation

By H. J. HENSE

American Gas Association Testing Laboratories

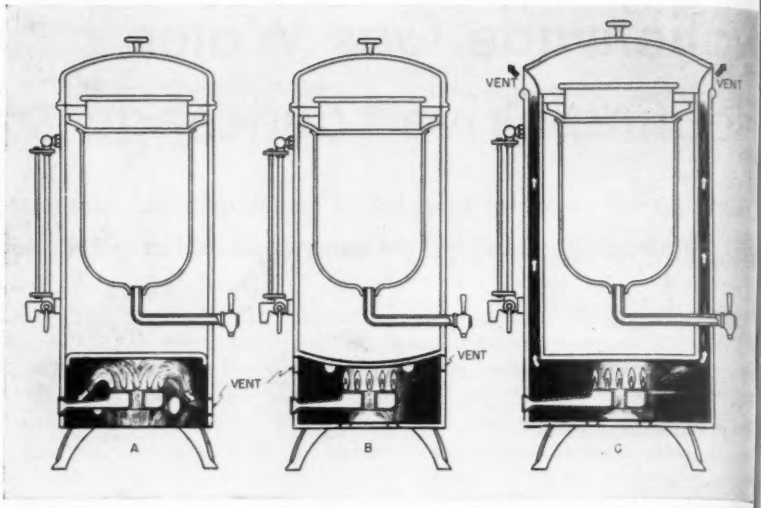


Figure 1. Venting coffee urns: (A) Vents too low, gas input limited, poor combustion, low efficiency. (B) Vents high enough to allow increased gas input, good combustion, increased efficiency. (C) Sufficient vent area easily provided, large heat transfer area, good combustion, good efficiency

● In keeping with modernization of counter equipment, most coffee urns produced today are made of stainless metals in attractive designs. Whether due to the desire to reduce costs in a highly competitive field or because of an insufficient knowledge of efficient gas utilization, these urns are often equipped with inferior gas controls and burners or are not factory equipped at all, leaving their selection and application to the installer.

Publication by the American Gas Association Testing Laboratories of a new research report on coffee urn design and heat application should prove of material help in the improvement of this equipment. The report will be of greatest value if it is distributed to coffee and water urn manufacturers by engineers thoroughly competent to explain its details. The data in this report is of value in other fields besides coffee and water urns, since much of it can be directly applied to the application of burner and control equipment to steam tables, water baths, pot sinks, and others.

Supplementing the report, A. G. A. engineers in New York are always ready to offer technical assistance to any urn manufacturer in the solution of gas utilization problems, while the burner manufacturer members of the Gas Appliance Manufacturers Association are equipped to design and supply suitable burners and controls for proper heat application. If sufficient interest in the gas urn improvement program is shown by the manufacturers, A. G. A. is prepared to hold a short lecture course covering in detail the recommendations presented in the report and related material.

This article should be of interest not only to utility companies conscious of the bad effect on the public who see coffee urns in operation with poor flame characteristics, but also to kitchen equipment houses which will recognize the advantages resulting from better heat application to urns. By a cooperative effort on the part of everyone concerned, it should be possible to modernize gas coffee urns and make them a more efficient counter appliance.

NOTHING more complicated than the simple application of well-established design principles is necessary to bring about major improvement in the vast majority of contemporary gas-fired coffee urns.

This statement stems from a study undertaken by the Laboratories for the American Gas Association's Committee on Industrial and Commercial Gas Research. The report covering this study, published as the first of a series of reports on the factors affecting the application of gas to counter appliances, presents practical design information for improving both the appearance and operation of various types of coffee urns.

Higher performance and efficiency of urns can be achieved most readily through better application of heat. Urns correctly designed from a gas application standpoint are available but for the most part only in the "deluxe" lines of relatively few major manufacturers. The majority of manufacturers of standard urns do not appear to have taken full advantage of known principles of appliance design. Principal emphasis has been devoted to ways and means of fabricating the urns rather than to over-all design. In fact it is common practice to leave the question of the method of heat application to others, as burners are often purchased and installed in the field rather than made part of the integral design of the appliance.

Efforts at improvement to date have been directed mainly toward better extraction of the essence from the coffee, improving the quality of the brew, and expediting the transfer of water from one chamber to another. Methods of heating, control, aeration and venting have received comparatively little attention.

Adequate venting is a design factor of utmost importance. Many urns actually utilize less than half of the heat available. With good design for proper venting incorporated in an urn, considerably improved efficiency can be obtained without materially increasing manufacturing cost.

Figure 1 shows various venting methods. Sketch A illustrates an unsatisfactory method of venting resulting from improper location of the vent openings below the top of the burner or from improper positioning of the burner. This allows combustion products to collect around the flames thus choking off secondary air necessary for complete combustion, which is a

mitted at the bottom. Under such conditions the flames are obliged to reach out for air thus giving rise to a floating condition. For proper venting at least one square inch of vent area should be provided for each 5,000 hourly B.t.u. input to the gas burner.

Sketch B of Figure 1 illustrates employment of a convex heat transfer surface which permits positioning vent openings sufficiently high above the burner to allow combustion products to pass over all the heat transfer surface before leaving the appliance. This arrangement improves the performance and efficiency of the burner thus increasing the over-all efficiency of the urn.

Sketch C, illustrating the venting of flue gases up through an annular space surrounding the urn and out the top, represents the most desirable method in use. Comparative tests of a representative urn rebuilt in this fashion indicated a saving of 22.8 percent in gas used to heat the water for coffee making to 190° F. and a saving of 42 percent in gas consumption needed to maintain this temperature.

Secondary aeration, or the supplying of air around the burner head and flame as contrasted to primary air drawn in through the burner proper, is another important design factor. Sufficient air must be provided for complete combustion but an excess reduces efficiency by cooling flue products in contact with heat transfer surfaces. Effects of varying amounts of secondary air upon burner performance are shown in the sketches of Figure 2. The area of openings for secondary air should be the minimum for satisfactory combustion with a reasonable margin of safety for differing field conditions. This area can be related to gas input rate. For general application a value of one square inch of opening is employed for gas input rates varying between 2,500 and 5,000 B.t.u. per hour depending on the individual application.

With venting and secondary areration such important design factors influencing burner performance, it follows that location and design of the burner itself are also technical factors having far-reaching influence on over-all design. Effects of burner location are graphically illustrated in the sketches of Figure 3.

Desirable burner operating characteristics include the following seven points: 1) Controllability over a wide range of turndown without danger of flashback. 2) Maintenance of satisfactory aeration and primary air injection. 3) Satisfactory heat distribution. 4) Complete combustion. 5) Flame stability. 6) Ready and complete ignition. 7) Ignition, operation, and extinction without undue noise.

Commonly accepted principles of burner design are shown in Figure 4. Design details as well as methods of arriving at the correct gas input rating and conduct of thermal efficiency tests are presented in the report. Suggested heat inputs for various urn sizes, total

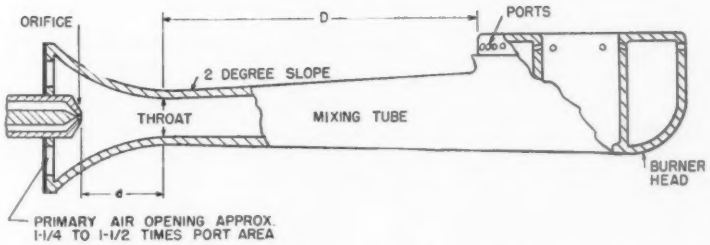


Figure 4. Generally accepted atmospheric gas burner design principles employing a horizontal mixing tube. Throat area = 0.35 to 0.50 times port area, smooth mixer. D = at least six throat diameters additional length permitted. d = approximately 1.5 to two throat diameters

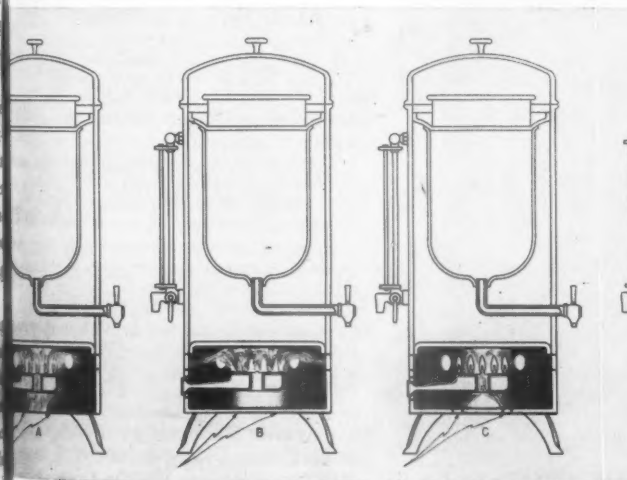


Figure 2. Effects of secondary aeration upon burner performance. (A) No means for air control, excessive secondary aeration, heat wasted to warm excess air. (B) No aeration openings, insufficient secondary aeration, poor combustion, flames streaming—outer mantle not defined. (C) Secondary air openings, proper secondary aeration, aeration plate close to burner, openings one sq. in./2,000-5,000 B.t.u./hr. input around burner periphery

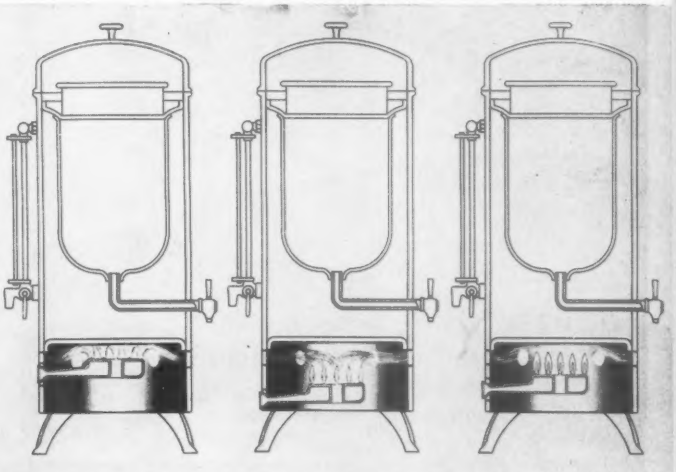


Figure 3. Effects of burner location upon burner performance. Examples above show: (left) Burner too close to heat transfer surface, poor combustion, low efficiency; (center) burner too far from heat transfer surface, low efficiency, low heat transfer, heat carried away in flue gases, and (right) burner properly located

DESIGN DATA FOR URNS OF VARIOUS SIZES

Urn Dia. In.	Burner Input B.t.u./Hr.	Total Port Area and Number of Ports Required							
		Mfd. No. 38 DMS		Nat. No. 30 DMS		LP No. 32 DMS		Univ. No. 34 DMS	
		Sq. In.	No.	Sq. In.	No.	Sq. In.	No.	Sq. In.	No.
10	10,800	.36	45	.72	55	.60	57	.72	74
11	12,900	.43	53	.86	66	.72	68	.86	88
12	15,400	.51	63	1.02	79	.85	81	1.02	105
13	18,000	.60	74	1.20	92	1.00	95	1.20	124
14	20,800	.70	87	1.40	108	1.16	110	1.40	144
15	23,800	.80	99	1.60	123	1.33	126	1.60	165
16	27,200	.90	111	1.80	138	1.50	133	1.80	185

burner port areas, and number of ports required are summarized in the preceding table.

Modern trends towards streamlined outer shell contours where piping, controls, and appendages such as legs are concealed by bright, plain surfaces, may be employed to the designer's advantage in providing adequate venting, aeration, and burner operation. Both improved appearance and increased efficiency thus obtained are decided factors of saleability and customer satisfaction. An artist's conception of a streamlined urn is shown in Figure 5.

Use of automatic controls requiring less supervision results in uniformly high operating efficiency, reduces the possibility of unsatisfactory operation, and eliminates the likelihood of accidental injury to the urn.

Important to such control is the specification of gas valves of suitable design and capacity. Urn burners having gas input ratings of 30,500 B.t.u. per hour or less should employ a ¼ inch A. G. A. "listed" gas valve. Larger burners having input rates up to 79,000 B.t.u. should employ a ⅜ inch size. Separate valves to pilot burners should be provided. Contemporary urns do not appear to take full advantage of flame observation ports to facilitate control and contribute to increased safety.

Maintenance of coffee at the proper serving temperature is another factor which can be effectively controlled. Thermostatic devices maintain temperatures between predetermined limits. Their use consequently results in both increased efficiency and improved flavor of the coffee.

Emergency relief devices are essential for those urns and appurtenant water heaters that operate above atmospheric pressure. Good practice requires that combination pressure and vacuum relief valves be employed to prevent excessive stress on the tanks. Additional protection may be provided through the use of temperature relief valves or combination valves of such type.

Additional information on such engineering factors as a design of mixer heads and mixer tubes for adequate primary aeration, construction of air shutters, and methods of calculating heat input required for any given urn is presented in the report. In addition, numerous research bulletins on various phases of gas burner design are available from the Laboratories which go into more detail on the fundamentals of design. Those bulletins applying specifically to the various parts of a burner were enumerated in the January 1947 issue of the A. G. A. MONTHLY under the title "Laboratories Guide to Burner Design." Reprints are available from the Laboratories.

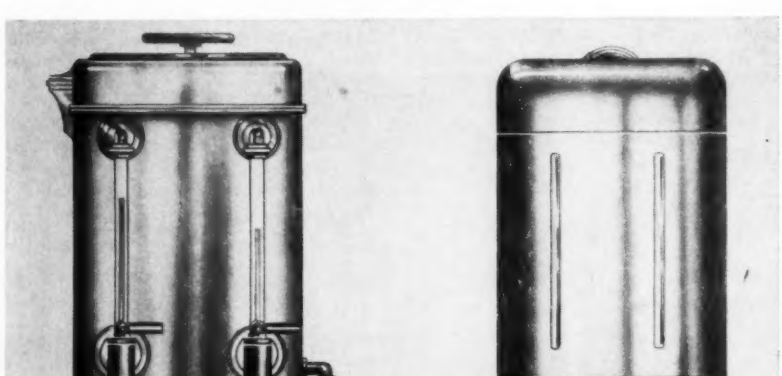


Figure 5. Artist's sketch of improved coffee urn design

Large Gas Holder Added To New Jersey System

A NEW five million cubic foot gas holder has been placed in operation by Public Service Electric & Gas Co., Newark, N. J., at the company's Central Works, Piscataway town.

The huge tank, 193 feet in diameter and 240 feet high, is of the water-sealed telescopic type and will more than double gas storage capacity in the company's central division.

Thomas L. Mellick, division engineer, gas department, central division, opened the main valve leading to the compressors at the inaugural ceremony. Mr. Mellick will complete 50 years with Public Service and predecessor companies in September.

Present were: George H. Blake, president; Jacob T. Barron, vice-president in charge of combined operations; Frederick A. Lydecker, vice-president in charge of gas operation; Robert H. Philipps, Jr., general manager, gas department; William J. Harvey, general superintendent of gas manufacture; Henry W. Nicolson, general superintendent of gas distribution; William J. Lutz, engineer of construction; John S. Hurd, engineer of gas manufacture, central division, and other officials.

Fuels of the Future

Changes taking place in mineral fuels supply channels indicate further expansion of natural gas industry during next decade

By LYON F. TERRY[1]

Second Vice-President
Chase National Bank
New York, N. Y.

L. F. Terry

OUR country has been endowed with abundant resources of the mineral fuels—coal, oil, and natural gas. In New England coal has long been the basic fuel, oils have generally been in plentiful supply, while natural gas has been thought at too great a distance to be obtainable. Following the recent tight situation in oil supplies, however, gas men are asking: "Will there be enough oil in the future?" And many are also interested in the current efforts to bring natural gas to the northeastern states. Hence it may be timely to consider the future supplies of the three mineral fuels.

Reserves of coal in the United States have been assumed to be so large as to require little concern. The U.S. Geological Survey has for years estimated our coal deposits which are capable of being mined to be in excess of 3,200 billion tons, of which approximately 2,000 billion tons should be recoverable. The annual production of coal approximates two-thirds of a billion tons; hence our supply has been assumed to be good for several thousand years.

Recently, however, in a paper presented before the annual meeting of the American Institute of Mining and Metallurgical Engineers, A. B. Crichton attacked the validity of the old estimates. He presented in detail his estimates for areas with which he is familiar and by other mining men for other districts, all aggregating 223 billion tons. Mr. Crichton contends that the country as a whole has but around 250 years of recoverable supply, while "in the highly industrialized east, where 92 percent of the coal is produced and used," he estimates only a 90 years' supply.

The response of representatives of the U.S.G.S. was that, while the old estimates of the Survey were necessarily based upon incomplete data and were probably too large, they think the Crichton estimates to be extremely low and are convinced that the reserves of coal are comfortably large for all present demands and any reasonable increases in demands. Regardless of the wide range in such estimates and the uncertainty as to the precise quantity of our coal reserves, it is evident that there will be adequate supplies of coal for a future period to be reckoned in centuries rather than in decades. The immediate problem is the supply of oil and natural gas.

Sharp Rise in Oil Consumption

Since the war there has developed a surprisingly sharp increase in the consumption of petroleum products, particularly of the fuel oils and kerosene. In 1947 the domestic demand for these fuel products was 13 percent above that in 1946, compared with an increase in gasoline of only eight percent and a rise in the consumption of all petroleum products of 11 percent. Numerous factors contributed to the advance in the use of the fuel products, including conversions from coal to oil in house heating, an increase in the use of Diesel engines, more farm tractors, and other factors. A growing preference for cleaner, more convenient heat and more efficient fuel has been an underlying force, made possible by higher public income and stimulated no doubt by the actions and threats of the coal unions.

But the swing to the use of fuel oils could not be met without considerable strain and expense on the part of oil refiners. For decades gasoline has been the money product of refineries, with residuals, including fuel oil, as secondary products, available in over-supply and at cheap prices. With the demand for fuel oils increasing the faster, refiners were forced to increase the ouput of these products at the expense of gasoline. They were partially compensated for the shift in yields by a sharp increase in the prices for fuel oils.

High prices and shortages in supply here and there should slow down the strong preference for liquid fuels. In fact, while oil heating furnaces in service increased 27 percent during 1947, there were only one-quarter as many unfilled orders at the end of the year as at the beginning and cancellations of orders exceeded new orders in the last quarter of 1947. On the other hand, of the 1,226 railroad locomotives on order by all Class I railroads January 1, 1948, 97 percent were Diesels. The increasing demands for fuel oils will also face the competition of the delayed but certain expansion of the natural gas industry.

Demand Increases

The recent increase in demand has been so rapid that the industry's distribution facilities have been unable to fully keep pace with it in view of shortages in steel and the tight supply situation resulted. But the petroleum industry gave a good account of itself. Crude oil production was increased seven percent in 1947 over 1946, many additional tankers were placed in service, tank cars are being utilized prior to completion of the more economical pipe lines for transporting crude from new fields and the industry has launched upon an extensive program of exploration and construction. These preparations for expanding the facilities of all departments will take time, but, given time, will provide for any normal increase in consumption.

In short, the current tight supply of oils is largely due to a sudden upsurge in the long-term growth of a major industry. While the sharp rise in demand was unforeseen by the industry, there is little justification for expecting such a high rate of increase to be sustained. For a broad perspective, the 11 percent increase in over-all domestic consumption in 1947 over 1946 may be compared with the average annual rate of increase over the past 25 years of only five percent, and

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[1] Presented before the New England Gas Association, Boston, Mass., March 19, 1948. For suggestions in the preparation of this paper, the author is indebted to his associates in the petroleum department, The Chase National Bank, particularly Dr. Joseph E. Pogue and Gail F. Moulton.

a straight line upward trend since the depression low of 1932 of six percent.

Future Supplies of Oils

The proved reserves of crude oil and related natural gas liquids in this country at the close of 1947, as estimated by the Committee on Petroleum Reserves, American Petroleum Institute, were 24.7 billion barrels. Production in 1947 was 2.0 billion, indicating a ratio of reserves to annual production of 12.3. This ratio should *not* be interpreted as indicating the future life—it reflects only the current position of supply as an index of working stock on the shelf or gas in the holder. New discoveries and extension of old oil fields have continually added to proved reserves known at any given date and, in recent years, the reserve ratio has varied from as low as seven in 1925 to 14 or 15 at the beginning of the last war. In addition to reserves now proved, there are vast reserves to be discovered year after year in the regular program of exploration which maintains the inventory of supply.

There are 1½ million square miles of sedimentary lands in the continental United States geologically adapted to the formation and retention of deposits of oil and natural gas. Of this total area, about 20 percent is currently under lease and being tested or held for future exploration. According to Wallace E. Pratt,[2] a distinguished petroleum geologist, only about 8,000 square miles have been thoroughly explored. From comprehensive studies of areas previously found to be oil bearing compared with the total of 2½ to 3 million cubic miles of sedimentary rocks having geologic possibilities for producing oil and gas, Mr. Pratt concluded a few years ago that the reserves remaining to be discovered underlying our land areas would be not less than those which had been proved in the past, then totalling approximately 50 billion barrels.

Mr. Pratt has recently made an exhaustive study[3] of the continental shelves adjoining the ocean shores and extending seaward under the tidelands. He points out the probable existence of deposits of oil and natural gas contained therein in quantities much larger than our present proved reserves. What portion of these vast resources of oil and natural gas may become recoverable cannot yet be estimated, but exploration of these tidelands has begun and offers a future source of oil of a large order of magnitude.

But the most promising prospects were drilled first, and it is becoming increasingly evident that future wells must be drilled deeper and deeper, and some will involve the expensive conditions of exploiting the sedimentary rocks lying under water, off shore from the mainland. As oil finding becomes more difficult and expensive in this country, development is being accelerated in foreign fields which, it is believed, will provide more abundant and less expensive sources of future supply. Since 1920-1922 when imports, principally from the flush fields of Mexico, exceeded our exports, the United States has been an exporter, on balance, of petroleum and its products. In 1947 our exports practically balanced imports, and we are now becoming a net importer of oils. It is believed that within the next three to five years we will probably be importing some ½ million barrels per day, principally from Venezuela.

From a world-wide standpoint, the area offering the largest known reserve, present and future, is the Middle East—Iran, Iraq, Arabia, and the Persian Gulf country. This area will probably become the future center of the world's petroleum industry. It is being rapidly developed and should soon supply western Europe, thereby releasing for use in the United States large supplies from Venezuela now going to Europe. The vast potential reserves of Venezuela are also being actively developed and its production can readily be increased.

To sense the future supply possibilities of foreign fields, it may be noted that the nine billion barrels of known reserves in Venezuela are equal to 20 times its current annual production, while the 30 billion barrels of known reserves in the Middle East are 80 times the present annual rate of production. And the potential future additions to presently known estimates in both cases are vast. Developments in the Middle East will require several years for the construction of three major pipelines to eastern Mediterranean ports, new refineries, and tankers, but by 1950-52, barring wars, these developments, together with those of the Western Hemisphere, should bring the world supply of oils into a comfortable balance with all demands.

The United States has been producing slightly over 60 percent of the world supply from only a modest portion of the potential world-wide reserves of oil. This cannot be continued indefinitely. Our position with respect to supply is becoming a function of the larger world-wide petroleum industry. And there seems no question but that on a world-wide basis there will be sufficient supplies of crude oil for as far as we can see into the future.

Fuel requirements of this country are supplied in the proportions of about 52 percent by coal, 35 percent by crude oil and related liquids, and 13 percent by natural gas. These are the mineral fuels, which provide 96 percent of our energy requirements, while water power furnishes four percent. For the last 30 years the production of coal has not increased, but the expansion in the country's fuel requirements has been met by the rapidly increasing production of crude oil and natural gas. This is pictured in the accompanying Figure 1.

Advantageous Position

The low prices of oil and natural gas, considering operating efficiencies and other relative factors, have provided a considerable advantage to oil and natural gas in their inter-competition with coal. As the cost of finding and producing oil gradually rises concurrently with increasing imports, the competition for the fuel markets may become less favorable to oil. It is probable that coal and natural gas will become increasingly effective in absorbing larger proportions of the fuel markets, all to the end of prolonging the supply of our crude oil reserves. No executive order will be required to bring about the proper proportion of usage of the alternative fuels. The law of supply and demand will provide the inducement if unhampered by government interference, industry is able, willing and amply equipped to carry it out.

You are familiar with the announcements of several new processes for the synthetic production of oil products. Two new plants are under way for making motor fuel, Diesel oil, and certain chemicals from natural gas. A pilot plant operation which may lead to large-scale conversion of coal is being undertaken at Pittsburgh for the synthetic produc-

[2] Oil In the Earth, Wallace E. Pratt (Univ. of Kansas Press, 1944).
[3] Petroleum on Continental Shelves, Wallace E. Pratt (Bull. of A.A.P.G., Vol. XXXI, 1947, No. 4).

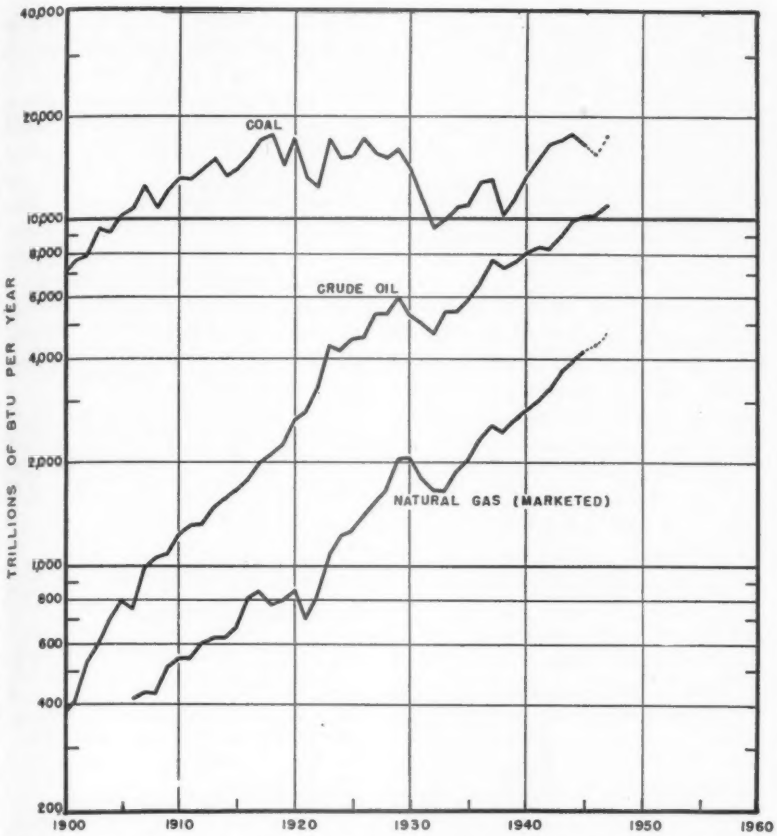

Figure 1. U. S. Production of Mineral Fuels. Source—Bureau of Mines. Estimated is indicated by ---

tion of oil products and natural gas substitutes. These processes involve high-cost plant investment per barrel of product—much higher than for petroleum refineries.

It is claimed that motor fuel can be produced from natural gas at prices now competitive with refinery production. The number of such gas conversion plants, however, may be limited by the rise in the field cost of natural gas which would be brought about by an extensive expansion of such a new industry and the increasing requirements for natural gas by utilities, as well as by the possibility of flooding the chemical market with the special chemicals produced as by-products. The developers of the coal conversion plants estimate that motor fuel may be produced at only a few cents per gallon above present refinery prices. The same comparative economics exist for oil shales, which ultimately should provide reserves of liquid fuels of the order of 100 billion barrels in this country and larger deposits in western Canada.

It seems probable that these new processes will require years of pioneering and that their development will be slow. But for the broad picture of the major supply of oils in the next generation or so, it would seem more significant that the crude oil resources of this country and the world will be sufficient to provide our requirements, and that any additional supplies of synthetic oils that may be made available by new processes will further extend the life of the oil age. For the distant future, the petroleum industry will no doubt need to look more and more for its source material to the greater reserves of coal and oil shales; that is, if development of atomic energy doesn't provide our requirements in ways which we cannot yet predict.

Extension of Natural Gas Pipelines

The introduction of natural gas into markets more distant from the source of supply has been slow. It has required improvement in materials and transmission technique. Electric weld pipe, brought out about 1927, provided a marked advantage by allowing the use of high carbon steel, that is, higher strength steel pipe, thus permitting the use of greater pipeline pressures. Extended and expanded markets required larger diameter pipelines, which, with higher pressures, resulted in lower transportation costs per M.c.f. per mile. But development of the natural gas industry was deferred by the depression of the 1930's, then by the war, and since by the country-wide shortage of steel. Despite such handicaps, natural gas is now being transported from Texas to California, and from Texas to Philadelphia, while a project is under consideration for a new line to the New York City area and another to New England.

Natural Gas Resources

Proved reserves of natural gas, as now estimated by the Committee on Natural Gas Reserves, American Gas Association, are approximately 166 trillion cubic feet.[4] Production was 5.63[5] trillion last year, indicating a reserves to annual production ratio of 29.5. As with exploration in the search for oil, the new discoveries and extensions of old gas reservoirs have more than kept pace with production, with the result that estimates of proved reserves are higher now than at any time in the past.

In a general way, additions to the proved reserves of natural gas have for several years been about twice the amount of gas produced and, on a calorific basis, comparable with the new discoveries of oil. There are reasons to believe that as the oil and gas industry needs to drill deeper for its supplies there will be as large, and possibly a larger, proportion of natural gas discovered than of oil. The deposits of natural gas found at increasing depths are compressed by the higher reservoir pressures encountered, and hence occur in double and treble the amounts per cubic foot of reservoir space as those found in shallower strata. By contrast, oil found at great depths is not noticeably

[4] See report of A. G. A. Committee on Natural Gas Reserves, p. 25 this issue.

[5] Total net production, 5.63 trillion, although *marketed* production for 1947 is here estimated at 4.40 trillion cubic feet.

	Oil and Condensates	*Natural Gas*	*Oils to Natural Gas*
	—Trillion B.t.u.[a]—		*—Ratio—*
Presently Proved Reserves	148,450	165,930	.89
Production, 1947	12,070	5,630	2.15
Ratio: Reserves to Production	12.3	29.5	—

[a] Oils at six million B.t.u. per bbl. Gas at 1,000 B.t.u. cu. ft. Graphs in Figure 1 are from Bureau of Mines data where gas is taken at 1,075 B.t.u. per cu. ft., oil at 6 million B.t.u. per bbl., bituminous coal at 13,000 B.t.u. per lb., and anthracite at 13,600 B.t.u. per lb.

compressed and, in fact, generally contains large quantities of gas in solution, thus reducing the net content of oil per cubic foot of reservoir space. Thus in deep drilling, especially along the Gulf Coast, large proportions of hydrocarbons discovered have been found to be in the form of gas.

Features Compared

There is also ample geological indication by comparing the features of the sedimentary rocks already found to contain gas, with those of the vast geologic basins and prospective areas remaining to be explored, to convince one of the great reserves of natural gas awaiting future discovery.

The known reserves of the fluid fuels may be compared on a calorific basis as shown above.

Thus the known reserves of oil and related natural gas liquids are slightly less than those of natural gas, although production of oil is proceeding at more than twice the rate for natural gas. During the next ten years, in addition to the expansion of existing natural gas distribution systems, new lines will no doubt be built from West Texas to California, from south Texas to the northeastern seaboard, and to the southeastern seaboard. The pipelines emanating from the Texas Panhandle and the Hugoton field of southwestern Kansas to the north central states may need to augment their supplies through new lines extended southward to the Texas Gulf Coast. The price of gas in the field will rise substantially, thereby causing reduction of the present wastage of gas produced with oil in the oil fields, and providing encouragement for increased finding effort. Thus, during the next decade, the natural gas industry will expand much further, with the present 5.6 trillion feet of annual production rising to eight or nine trillion, along with an unpredictable, but probably substantial increase in known reserves. The natural gas business is not in a liquidating phase—it is still a going concern facing increasing business that will be provided by expanding inventories.

The larger problem of what will be the total ultimate quantity of recoverable natural gas, both now proved and yet to be discovered, is most difficult to approach. By comparing the proportion of the country's prospective gas lands that had already been explored with the cumulative reserves discovered, I ventured an estimate four years ago that the future recoverable reserves were of the order of 300 trillion cubic feet or more.[6] Since that study was made, much more has become known as to the extent of our proved reserves, and particularly as to the possibilities of recovery of the very large reserves of oil and gas in the thick sedimentary strata extending seaward under the shallow waters offsetting the Gulf Coast. It is now evident that the 300 trillion estimate was decidedly too conservative.

Our resources of natural gas are not inexhaustible. But it is my opinion that for any normal expansion of demand, the natural gas industry will be able to maintain satisfactory supplies for at least a generation and probably longer.

Fundamental changes are taking place in the channels of supply of the several mineral fuels.

Coal offers future supplies sufficient for many times the life span of oil or natural gas.

Since the war, price levels generally have been rising. But the basic cost of finding and producing new deposits of oil and natural gas is increasing, even relative to general price levels, owing to the greater difficulty and effort required in exploring at increasing depths. And oil suppliers will need to import a part of their wares to supply increasing demand.

While the cost of natural gas at the well will continue to rise, the price delivered at long distances is largely composed of transportation costs. And the real cost of transporting gas, in terms of the steel and labor required per M.c.f. per mile, has been reduced by improvements in materials and technique, and increase in the volumes handled. There remain no physical factors to prevent the piping of natural gas from the Rio Grande to Boston—2,000 miles.

With the possibilities of natural gas in New England just around the corner, fuel consumers, including the manufactured gas companies, may well consider the inter-competition, the respective advantages, and the probable supplies of the alternative fuels to be available in the future.

Biggest Inch Pipeline Film Now Available

A DRAMATIC full-color sound motion picture showing on-the-spot action scenes taken during construction of the Texas-California Biggest Inch pipeline has been produced under the sponsorship of Southern California and Southern Counties Gas Companies.

"Westward Flow" is the intriguing title of this film story of the great trek—the bringing of Texas gas to California. Skillfully edited scenes are woven into a narrative which shows the daring and magnitude of the undertaking, as well as its enormous importance to the Southern California area.

Additional prints of the 30-minute 16 mm. movie are being booked for showing to groups of 50 persons or more, such as clubs, schools, associations, industrial and business groups. The company will furnish screen, projector and a projectionist. For further details write to Mr. Houlgate, Room 413, 810 South Flower St., Los Angeles, Calif.

Heating and Ventilating Databook Published

A LARGE volume of reference tables, charts, and text by Clifford Strock entitled "Heating and Ventilating's Engineering Databook," has been published by The Industrial Press, 148 Lafayette St., New York 18, N. Y.

The new book is for everyday use by heating, ventilating and air conditioning engineers, contractors, architects, plant engineers, and engineering students. Emphasis is placed on the data needed in actual design. The price is $7, postpaid in the United States.

[6] Our Natural Gas Resources, Lyon F. Terry. (*Proceedings* A. G. A. Natural Gas Department, 1944).

Catalytic Reforming of Hydrocarbons

Results of A. G. A. Gas Production Research Committee project on catalytic process extended to include natural gas propane, commercial butane, and refinery oil gas

By C. H. RIESZ, P. C. LURIE and J. J. FIRST

Institute of Gas Technology
Chicago, Illinois

C. H. Riesz

THIS is the third in a series of reports on the catalytic reforming of hydrocarbons to be used in the production of peak load gas which will be interchangeable with the normal sendout gas. The first report[1] presented preliminary laboratory work and stated the general objectives.

The second report[2] described the initial pilot plant tests of gas making capacities and evaluated process conditions and requirements for reforming refinery propane. The present report extends the scope of the catalytic process to include natural gas propane, commercial butane, and refinery oil gas.

The next phase, already underway is the extension of these studies to liquid hydrocarbons including refinery and natural gasoline, kerosene, crude naphthas, and gas oils. In this further work it is recognized that problems of catalyst fouling by carbonization and sulfur poisoning will probably increase as the hydrocarbon mixtures become more complex.

In anticipation of these problems, future studies will include evaluation of other commercial catalysts as well as catalysts developed at the Institute of Gas Technology in order to obtain maximum catalyst activity, ruggedness and sulfur resistance. The selective and specific nature of catalyst behavior makes it highly desirable that testing facilities should be available to appraise the individual conditions and requirements peculiar to any utility considering the installation of catalytic gasification equipment.

As stated in a previous report[2] the pilot plant tests are being conducted in a modified Surface Combustion furnace atmosphere generator in the Tilghman Street gas plant, Philadelphia Electric Company at Chester, Pennsylvania. Related phases of the work are being carried on in laboratory units at the Institute of Gas Technology. Excellent correlation between pilot plant and laboratory units has been obtained in work thus far, a fact which should permit substantial acceleration in the rate of progress of future work.

P. C. Lurie

Experiments are planned to determine the possibility of operating at pressures from 45 to 75 pounds per square inch for the generation of gas directly into the distribution system without need for additional compression.

The most important feature of the present report is the observation that all gaseous hydrocarbon feeds tested in the pilot unit thus far were successfully reformed. (Results are presented in Table 4, which accompanies this report.) While the number of feeds investigated was only four, there is every indication that any hydrocarbon feed which is normally gaseous can be reformed. The usefulness of catalytic gasification is thereby greatly expanded since not only can feed stocks be chosen on the basis of cost but also, during peak emergencies, all available gaseous feed stocks may be utilized without major change in operating conditions, or any change in the catalysts. (The process requirements for these various feeds are presented in Table 5.) As time permits and depending upon the work with liquid feeds, additional gaseous feeds, including natural gas and several types of butane, will be investigated.

J. J. First

Illustrative of the use of the process, experimental data from one of the tests with butane have been used to calculate the approximate process requirements for three sizes of peak load plants generating a 520 B.t.u. 0.70 specific gravity gas (Table 1).

The cost of the process will be a matter for calculation by individual companies since the various utility and construction costs can vary widely.

A catalyst containing 3.8 percent nickel upon a refractory support proved

TABLE 1—CALCULATED PROCESS REQUIREMENTS FOR PEAK LOAD GASIFICATION
Based on Run 52B

	5	*10*	*25*
Capacity, million cu.ft./day, M.c.f. per hr.	208	416	1,040
Butane for reforming, gallons/day	12,600	25,100	62,900
Butane for enriching, gallons/day	10,900	21,900	54,600
Total butane, gallons/day	23,500	47,000	117,500
Air, cu.ft./min.	350	700	1,750
Steam, lbs./hr.	5,230	10,460	26,200
Catalyst, cu.ft.	81	162	405
Catalyst tubes, number required*	23	45	113

*Assuming catalyst tubes 20 feet long and 5.75 inches in diameter filled with catalyst.

[1] Riesz, Komarewsky, Kane, Estes and Lurie, A. G. A. MONTHLY, April 1946, pp. 159-64, 190.
[2] Riesz, Batchelder and Lurie, A. G. A. MONTHLY, February 1948, pp. 17-22.

TABLE 2—ANALYSIS OF FEED STOCKS

Analysis, %	*A* *Refinery No. 1*	*B* *Propane No. 2*	*C* *Natural Gas Propane*	*D* *Commercial Butane*	*E* *Refinery Oil Gas*
Methane, CH_4	—	—	—	—	29.6
Ethylene, C_2H_4	—	—	—	—	4.2
Ethane, C_2H_6	6.2	0.3	8.7	—	20.2
Propylene, C_3H_6	32.0	21.0	0.0	3.0	8.7
Propane, C_3H_8	60.7	78.2	88.3	14.9	26.6
Butylene, C_4H_8	—	—	—	6.6	0.8
Isobutane, i-C_4H_{10}	—	0.5	3.0	9.1	4.1
Normal butane, n-C_4H_{10}	—		—	66.4	
Pentane, C_5H_{12}	—	—	—	—	0.5
Hydrogen, H_2	—	—	—	—	4.3
Air	1.1	—	—	—	0.9
Total	100.0	100.0	100.0	100.0	99.9
Specific gravity*	1.49	1.54	1.53	1.96	1.08
B.t.u./cu.ft.*	2347	2435	2423	3070	1764
Molecular weight*	42.4	43.6	43.1	55.3	30.6
Cu.ft./gal. liquefied gas*	38.2	37.7	37.2	33.2	—

*Calculated.

TABLE 3—EVALUATION OF CATALYSTS

Run No.	*31*	*38*	*20**	*47*	*34*	*35*	*50*
Hydrocarbon charge	Refinery Propane				Natural Gas Propane		
Catalyst	III	IV–V–III	I	II	III	III	II
Duration of test, hrs.	61	33	43	84	14	8	51
Furnace temperature, °F.	1850	1850	1840	1850	1825	1825	1785
Hydrocarbon feed, gallons/hr.	2.64	2.64	2.64	2.35	2.69	2.66	2.71
Steams, lbs./gallon feed	10.4	10.6	12.0	11.2	9.3	6.9	7.8
Air, cu.ft./gallon feed	56.8	56.8	48.1	54.9	38.7	38.7	37.3
Cu.ft. carrier gas/gallon feed	287	309	327	354	341	349	342
Space-time-yield cu.ft. carrier gas/cu.ft. catalyst-hr.	1217	1034	1416	1487	1475	1494	1535
Carrier gas analysis, %							
Carbon dioxide, CO_2	5.0	7.6	5.4	4.8	7.6	4.2	5.2
Illuminants	3.4	3.3	0.7	1.1	0.4	0.6	0.6
Oxygen, O_2	2.2	2.2	0.9	0.6	0.8	1.0	0.3
Hydrogen, H_2	47.8	50.4	51.1	52.5	56.0	56.5	59.0
Carbon monoxide, CO	17.6	14.3	18.3	20.8	18.0	20.8	18.0
Paraffins, C_nH_{2n+2}	7.7	6.1	5.9	4.7	4.0	4.2	4.0
Nitrogen, N_2	16.3	16.1	17.7	15.5	13.2	12.7	12.9
Heating value, B.t.u./cu.ft., Observed	340	312	300	290	294	298	288
Specific gravity, Observed	0.57	0.54	0.55	0.54	0.52	0.52	0.52

*Most favorable run in initial tests[2]

TABLE 4—CATALYTIC REFORMING OF GASEOUS HYDROCARBON FEEDS
Surface Combustion Special Catalyst (II)

Run No.	*49*	*48*	*50*	*47*	*51*
Hydrocarbon charge	Foul Oil Gas	Purified Oil Gas	Natural Gas Propane	Refinery Propane	Commercial Butane
Duration of test, hrs.	62	24	51	84	24
Furnace temperature, °F.	1850	1850	1785	1850	1840
Hydrocarbon feed, gallons/hr.	—	—	2.71	2.55	2.14
Steam, lbs./gallon feed	—	—	7.8	11.2	13.2
Air, cu.ft./gallon feed	—	—	37.3	54.9	40.7
Cu.ft. carrier gas/gallon feed	—	—	342	354	361
Cu.ft. carrier gas/cu.ft. feed	5.9	6.6	9.2	9.4	10.9
Space-time-yield, cu.ft. carrier gas/cu.ft. catalyst-hr.	1154	1316	1535	1487	1226
Carrier gas analysis, %					
Carbon dioxide, CO_2	4.2	4.8	5.2	4.8	7.3
Illuminants	1.3	0.4	0.6	1.1	0.5
Oxygen, O_2	0.7	0.5	0.3	0.6	0.3
Hydrogen, H_2	50.8	54.2	59.0	52.5	61.2
Carbon monoxide, CO	16.6	18.9	18.0	20.8	20.7
Paraffins, C_nH_{2n+2}	7.8	5.9	4.0	4.7	2.1
Nitrogen, N_2	18.6	15.3	12.9	15.5	7.9
Heating value, B.t.u./cu.ft., Observed	318	289	288	290	278
Specific gravity, Observed	0.54	0.55	0.52	0.54	0.53

to be effective under a wide variety of conditions. This catalyst is available commercially from Surface Combustion Corp., Toledo, Ohio. Preliminary results with other commercial catalysts indicate that approximately equivalent results can be obtained under specific conditions. (These results are presented in Table 3.)

The sulfur resistance of the nickel catalyst employed is limited, but apparently quite adequate for commercial fuel stocks such as propane and butane if reasonable amounts of air are properly employed.

In the case of refinery oil gas, in which the sulfur was present chiefly as hydrogen sulfide in concentrations averaging 50-70 grains per 100 cubic feet, fouling of the catalyst with carbon and a lowering of the catalytic conversion was noted, limiting the length of the run to 60-70 hours without regeneration.

The need for research to find other sulfur resistant catalysts for reforming sulfur bearing hydrocarbons is clearly indicated.

Experimental

The pilot plant general operating conditions and catalyst regeneration procedures are the same as those described in the preceding report.[2]

Feed stocks are described below and their analyses are given in Table 2.

(a) *Refinery propane* was obtained from the Carbide and Carbon Co., Pyrofax Division.

(b) *Natural gas propane* was procured from the Hope Natural Gas Co., Clarksburg, West Virginia.

(c) *Commercial butane* was obtained from liquefied gas storage facilities at the Tilghman Street gas plant. The supplier was Standard Oil Co. of Pennsylvania.

(d) *Refinery oil gas* from the Marcus Hook refinery, Sinclair Refining Co., was used both as received and sulfur-free. Preliminary sufur removal was effected at the refinery which lowered the sulfur content to a value fluctuating from 150 grains per 100 cubic feet of gas down to as low as 20 grains. At the Tilghman Street gas plant, passage through iron oxide boxes provided a final degree of purification. The purified oil gas contained no detectable hydrogen sulfide and a maximum of 2.4 grains of

organic sulfur. Through special arrangements at the gas plant, the sulfur-removing equipment could be by-passed and foul oil gas could be delivered directly to the pilot unit.

In addition to a standard catalyst (I) of Surface Combustion Corporation used in the work on refinery propane described previously,[2] the following catalysts were obtained: Surface Combustion special catalyst (II) consisting of 4.8 percent nickel oxide (3.8 percent nickel) on a refractory brick support, the support being in the form of ¾-inch cubes; a commercial catalyst (III) designed primarily for the reforming of saturated gaseous hydrocarbon feeds; and a triple bed catalyst comprising commercial catalyst (IV), (V) and (III), this combination being recommended by the manufacturer for gaseous feeds containing unsaturates. In the present investigation the relative amounts used in the triple bed were in the ratio of 40:40:20 by volume, respectively.

Catalyst (III) consists of 28.1 percent nickel oxide and 12.5 percent chromic oxide on a magnesium silicate base. Catalyst (IV) contains 12.6 percent nickel oxide on a base of calcium aluminum silicate. Catalyst (V) is comprised of 9.5 percent nickel oxide on a similar base containing a somewhat lower amount of aluminum oxide.

The essential operating results, given in Table 3, indicate that the several catalysts, properly chosen, can be utilized for catalytic gasification of unsaturated and saturated propane. The data collected in Table 4 show that one catalyst (II) can be employed for several gaseous feeds.

In Table 5 below, estimated process requirements are presented to demonstrate application of the catalytic gasification process to make a gas of 520 B.t.u. per cubic foot heating value and 0.70 specific gravity from four gaseous feeds.

It is remarkable that feeds as diverse as refinery oil gas and commercial butane can be utilized in the catalytic gasification process to generate peak load gas of the same heating value and specific gravity. In Table 5, the relative amounts of hydrocarbon gas, steam and air have been adjusted to suitable operating conditions leading to minimum fouling of the catalyst by deposition of carbon.

Of particular importance is the catalyst volume required per M.c.f. of finished peak load gas. Since the size and number of alloy catalyst tubes is determined by this value, it is vital to reduce this figure to a minimum by selection of process conditions, feed stock and catalyst. The data of Run 52B (Table 5) demonstrate that the commercial butane tested is an excellent feed for the reforming process since 0.39 cubic feet of catalyst per M.c.f. of hourly capacity is the lowest value calculated thus far. However, this does not mean that further improvements in catalyst activity and operating effectiveness are not possible.

Composition of the finished gas does not appear to change greatly despite wide changes in the nature of the feed stocks although the exact composition of the paraffinic constituents would depend primarily upon the enriching gas used. Whereas the same gas has been used for reforming and enriching in each instance in Table 5, it might be advantageous to reform commercial butane to produce a low gravity carrier gas while subsequent cold enrichment with propane or oil gas would lead to a peak load gas of low dew-point in regard to the hydrocarbon content.

Storage of liquefied petroleum gases as butane (1.04 therms per gallon) rather than propane (0.92 therms per gallon) provides about 13 percent more potential gas making capacity for peak load use, an additional reason for considering butane as feed for catalytic gasification.

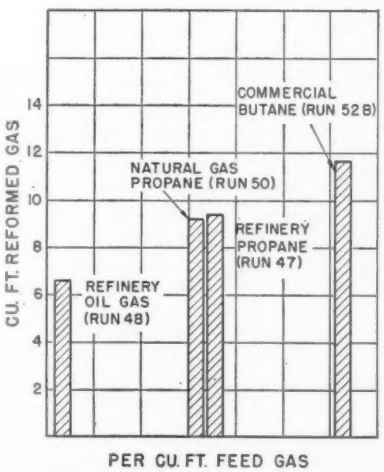

Figure 1. Yields of reformed gas from hydrocarbon feeds of different average molecular weight

The relationship between the volume of reformed or carrier gas and the volume of the charged gas shows a definite increase with an increase in the average molecular weight of the hydrocarbons comprising the feed stock (Figure 1). The increase is predictable from a consideration of the nature of the gases and the chemical reactions involved.

One of the most important factors in catalytic gasification is the transfer of heat from the furnace setting to the interior of the catalyst reactor where the necessary gasification reactions occur with an absorption of heat. Qualitatively, the smaller the diameter of the reactor tube the better the heat transfer conditions. On the other hand, small diameter catalyst tubes require relatively more metal alloy. Commercially, a balance between heat transfer, tube life, and cost of alloy tubes will have to be determined.

Most of the work performed to date has been in a five-inch reactor tube. A limited number of tests have also been made in a four-inch reactor tube (selected results are presented in Table 6). For propane, gasification at relatively high flow rates in a four-inch tube resulted in higher yields of gas per hour per cubic foot of catalyst (space-time-yield) than previously noted in a five-inch tube. Comparable tests of butane reforming in five-inch tube are not available.

The superiority of commercial butane over refinery propane is indicated in these tests by the respective values of space-time-yields. The value of 2,176 cubic feet of reformed gas per hour per cubic foot of catalyst is the highest value found in the present work.

Earlier investigation has not resulted in the development of a sulfur resistant catalyst. Some degree of resistance to poisoning by hydrogen sulfide through the addition of small amounts of air to the steam hydrocarbon mixture has been demonstrated in results obtained in the laboratories of the Institute of Gas Technology. In the tests reported to date, sulfur poisoning has not been a problem in the reforming of propane and butane.

In the reforming of refinery oil gas with the addition of air, sulfur present,

mainly as hydrogen sulfide in average amounts varying from 50-70 grains per 100 cubic feet, was tolerated by catalysts II, and IV-V-III for periods of at least 62 and 67 hours (Table 7). Although rising heating value of the reformed gas and increasing pressure drop across the catalyst bed are evidences of carbon fouling, the fact that reforming could be performed over the reported periods of time is encouraging. The problems of sulfur poisoning will require a continuous and intensive study to arrive at a satisfactory solution when hydrocarbons containing appreciable quantities of sulfur are to be processed.

Acknowledgment

The cooperation of the staff of the Philadelphia Electric Company is gratefully acknowledged. The suggestions and advice of E. G. Boyer and Ralph Jones have been invaluable. Active participation in the project at Chester by John W. Carroll, Martin Gavetti, Jr., Robert Brown, and Percy Vickers has materially expedited the work.

In all phases of the project, the members of the American Gas Association's Gas Production Research Committee and Technical Advisory Subcommittee for Project CPR-1C have shown keen interest, and appreciation of their aid and counsel is expressed. The contribution of Edwin L. Hall, formerly secretary-coordinator, A. G. A. Gas Production Research Committee, and of E. S. Pettyjohn, director, Institute of Gas Technology, in integrating practical objectives with research procedures must be emphasized. The assistance of Mrs. S. G. Dean of the Institute in making calculations is acknowledged.

TABLE 5—Process Requirements Per M.C.F. of 520 B.t.u., 0.70 Sp. G. Gas
Surface Combustion Special Catalyst (II)

Based on Run No.	*48*	*47*	*50*	*52B*
Hydrocarbon feed	Purified Oil Gas	Refinery Propane	Natural Gas Propane	Commercial Butane
Hydrocarbon, cu.ft.	292	207	207	157
gallons	—	5.5	5.6	4.7
Steam, lbs.	21.3	25.3	17.6	25.1
Air, cu.ft.	109	124	84	101
Flue gas for gravity control, cu.ft.	101	82	102	61
Catalyst, cu.ft./M.c.f. of hourly capacity	0.55	0.53	0.50	0.39
Gas Analysis, % (computed*)				
Carbon dioxide, CO_2	5.1	5.0	5.5	5.5
Illuminants	1.9	2.7	0.5	1.8
Oxygen, O_2	0.4	0.5	0.2	0.4
Hydrogen, H_2	43.3	43.7	48.0	45.7
Carbon monoxide, CO	14.9	17.3	14.7	16.8
Paraffins, C_nH_{2n+2}	13.4	10.6	11.7	11.8
Nitrogen, N_2	21.0	20.2	19.4	18.0
Total	100.0	100.0	100.0	100.0

*Assuming propane and butane are found as paraffins.

TABLE 6—Reforming of Butane and Propane
Surface Combustion Special Catalyst (II) in 4-inch Reactor Tube

Run No.	*53*	*52B*	*52A*	*47**	*56*	*55*
Hydrocarbon charge	Commercial Butane			Refinery Propane		
Duration of test, hrs.	42	144	71	84	45	62
Furnace temperature, °F.	1825	1850	1830	1850	1850	1850
Hydrocarbon feed, gallons/hr.	2.20	2.17	1.87	2.55	2.44	2.65
Steam, lbs./gallon feed	9.5	11.5	14.2	11.2	9.5	11.4
Air, cu.ft./gallon feed	22.7	46.1	51.9	54.9	45.5	38.5
Cu.ft. carrier gas/gallon feed	376	389	427	354	277	270
Space-time-yield, cu.ft. carrier gas/cu.ft. catalyst-hr.	2118	2176	2055	1487	1728	1829
Carrier gas analysis, %						
Carbon dioxide, CO_2	4.7	5.5	6.6	4.8	4.2	4.7
Illuminants	0.8	1.2	0.4	1.1	5.9	3.6
Oxygen, O_2	0.4	0.5	0.5	0.6	0.4	0.2
Hydrogen, H_2	59.0	52.8	55.4	52.5	42.2	50.3
Carbon monoxide, CO	20.9	19.4	18.4	20.8	18.0	18.9
Paraffins, C_nH_{2n+2}	4.9	6.0	4.6	4.7	8.8	7.0
Nitrogen, N_2	9.3	14.6	14.1	15.5	20.5	15.3
Heating value, B.t.u./cu.ft., Observed	322	308	284	290	371	342
Specific gravity, Observed	0.54	0.55	0.55	0.54	0.51	0.56

*Test with 5-inch reactor tube included for comparison.

TABLE 7—Effect of Sulfur Upon Reforming of Refinery Oil Gas

Run No.	*45*	*48*	*46**	*49**
Hydrocarbon charge	Purified Oil Gas		Foul Oil Gas	
Catalyst	IV-V-III	II	IV-V-III	II
Duration of test, hrs.	24	24	67	62
Furnace temperature, °F.	1850	1850	1850	1850
Hydrocarbon feed, cu.ft./hr.	120	121	119	118
Steam, lbs./cu.ft. feed	0.20	0.20	0.18	0.22
Air, cu.ft./cu.ft. feed	14.4	15.7	14.7	14.7
Expansion, cu.ft. carrier gas/cu.ft. feed gas	6.0	6.6	5.0	5.9
Space-time-yield, cu.ft. carrier gas/cu.ft. catalyst-hr.	1158	1316	958	1154
Carrier gas analysis, %				
Carbon dioxide, CO_2	9.2	4.8	9.2	4.2
Illuminants	1.0	0.4	2.8	1.3
Oxygen, O_2	0.4	0.5	0.4	0.7
Hydrogen, H_2	54.3	54.2	45.8	50.8
Carbon monoxide, CO	13.6	18.9	11.2	16.6
Paraffins, C_nH_{2n+2}	6.7	5.9	11.7	7.8
Nitrogen, N_2	14.8	15.3	18.9	18.6
Heating value, B.t.u./cu.ft., Observed	296	289	346	318
Specific gravity, Observed	0.56	0.55	0.59	0.54

*Run 46, 66 grains H_2S/100 cu.ft. oil gas.
Run 49, 50 grains H_2S/100 cu.ft. oil gas.

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Ventilating Hoods For Domestic Kitchens

Range-hood combination with built-in blower and motor suggested as a promising solution to kitchen ventilating problem

By HARRY L. WARREN

Assistant Research Engineer
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● The gas appliance laboratory operated jointly in Los Angeles by the Southern Counties Gas Company of California and Southern California Gas Company has been working for some time in the belief that one of the most promising ways of meeting the kitchen ventilation problem is to provide such ventilation at and from the gas range by incorporating into the gas range itself all the elements necessary for such ventilation, rather than by the use of conventional wall or ceiling fans as commonly installed in most kitchens either separately or in connection with cabinet work.

It is proposed to do this by providing a ventilating hood as an integral part of the gas range and also by building into the gas range the blower and motor. Thus the only installation necessary for complete kitchen ventilation, other than the range itself, would be sufficient duct to lead the blower exhaust to the outside air, which could preferably and in most cases be down through and along under the floor to an outlet in the foundation wall.

Several assemblies were constructed to obtain design and operating data, and finally a finished working model was produced, utilizing a current eastern made range selected because its construction was such that a hood could be adapted to it most easily. With the assistance of a western manufacturer a porcelain enameled metal hood was constructed and a blower and motor installed.

This model was exhibited in Los Angeles on February 25 at the Range and Refrigerator Council meeting of the Sales and Advertising Section, Pacific Coast Gas Association, for the purpose of obtaining comments and creating interest and possibly stimulating manufacturers to follow this development further.

From the comments and interest displayed it is believed that the demonstration was successful and the development work worthwhile. The accompanying article states the objectives in more detail and provides design and performance data.

A patent has been applied for on this design, to be assigned to Southern California Gas Company. If and when the patent is obtained the gas company will grant royalty-free license for production to approved manufacturers.

Figure 1A. View of range and hood combination showing fan and motor assembly and installation

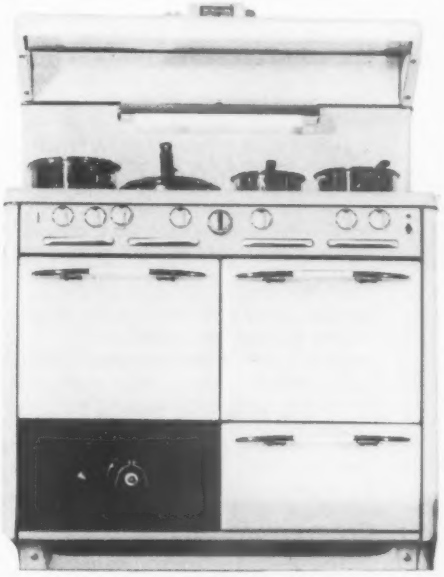


Figure 1B. Range and hood combination showing fan and motor assembly. Ductwork is below floor

Harry L. Warren

GREASE and smoke from hot fat, food odors, moisture and heat, are produced in cooking operations regardless of the type of appliance and type of fuel used. The emission of these by-products into the kitchen usually produces the following disagreeable conditions in this area: (1) rise in air temperature, (2) rise in relative humidity, (3) accumulation of grease and dust on wall surfaces, and (4) diffusion of cooking odors throughout other rooms of the house.

A project to design a mechanical-draft range hood capable of eliminating in large measure the disagreeable conditions enumerated above, which result from allowing the by-products of cooking operations to be liberated in the kitchen area, was instituted some time ago at the gas appliance laboratory, Southern Counties Gas Company and Southern California Gas Company.

Objectives

The specific objective of this investigation was the design of a hood which would meet the following specifications relative to both construction and performance:

(1) The hood and fan should be a standard factory built unit, designed to be attached to a range manufacturer's standard range model, so as to eliminate the expense and mechanical difficulties entailed in building or fabricating a mechanical ventilating hood system on the customer's premises.

(2) Installation of the hood and range combination should not require the running of exposed duct work or the furring-in of duct work in order to hide it from sight.

(3) Installation of the hood and range combination should not require the running of ducts through ceilings and roofs in order

Presented at February 25, 1948, meeting of the Range and Refrigerator Council, Pacific Coast Gas Association, Los Angeles, California.

to discharge the cooking vapors and ventilating air out of doors.

(4) Installation of the hood and range combination, in both old and new houses, should be easy to accomplish and low in cost.

(5) Combustion performance of the range should not be effected adversely when a hood is installed on a standard range model.

(6) Combustion performance of the range should be satisfactory either with the fan in or out of operation, so that use of the range is not dependent on the continuity of electric service.

(7) Installation of a hood on a standard range model should not effect the baking performance of the oven adversely when the fan is either in or out of operation.

(8) The forward projection of the hood and its height above the cooking top should be such that the housewife may look into the pans placed on the grates and may stir the contents of such pans either by hand or by means of an electric mixer head.

(9) The hood fan should be controlled by a manually manipulated electric switch located conveniently on the range, so that operation of the ventilating feature of the hood will be optional with the user.

(10) Ranges equipped with hoods should be capable of being used to supply heat to the kitchen when the user so desires.

(11) The hood should be designed so that when the fan is not in operation combustion products from the oven, broiler, and top section will be expelled far enough away from the wall so that these surfaces will not be soiled or streaked as a result of induced convection currents of room air.

(12) The air throughput of the fan should be small so that there will be no interference with the normal operation of winter and summer air conditioning systems.

(13) Consumption of electric current by the fan motor should be small, so as to limit operating costs to a very nominal amount.

(14) A facility for warming dishes and keeping cooked food warm should be incorporated as a part of the hood design.

(15) Design of the hood should be such that it will be easily adaptable as an added feature to a range manufacturer's regular line of standard models, so that he and his dealers need stock only standard range models and some hood kits.

Construction Features

The Gas Appliance Laboratory has designed a mechanical-draft range hood which meets the previously enumerated specifications relative to construction and performance.

This design is shown diagrammatically in Figure 2. The general over-all dimensions of the hood are 40 inches long, 15¾ inches deep, seven inches high at rear, and has a three-inch apron (13) in front. The splasher panel (8) is 13 inches high, so that the over-all height of the hood above the cooking top is 20 inches, and a clearance of 17 inches between the cooking top and the lower edge of the front apron (13) is provided.

Oven and broiler vents (2) connect with the hood as shown in Figure 2. Suction duct (18) connects the suction manifold with the inlet of a small multivane fan installed at the rear of the utility compartment of the range. The discharge of this fan is pointed downward so that it can be easily connected to a discharge duct located under the floor and extending from the range location to the nearest ventilation opening in the foundation wall of the house in which the range and hood combination is installed.

The hood, suction duct (18), the fan and motor unit and necessary electric wiring and switch would comprise the kit to be supplied by the range manufacturer for installation on one of his standard range models.

Operating Features

Combustion products, odors, vapors and grease splash droplets resulting from cooking operations in the oven and/or broiler are emitted through oven and/or broiler vent openings (1) into vent boxes (9) and rise by gravity, through vents (2) and ell connections into vent manifold (14) where they spread out to be distributed more or less evenly through a discharge slot (¾ inches wide by 38 inches long) formed by panels (4) and (5).

The combustion products and cooking vapors from the four-in-line top burners rise vertically from the cooking top, strike panel (5), and travel upward and forward below panel (5) until they contact apron (13).

When the fan is in operation, suction at the (¾ inch by 38 inch) horizontal suction slot (15) and the two (one inch by three inch) vertical suction slots (17) captures the combustion products and cooking vapors intercepted by apron (13). These products and vapors flow through suction chamber (12), into suction manifold (16) and through suction duct (18) into the suction opening of the fan. From the fan they are discharged into a duct located under the floor which extends from the range location to a nearby ventilating opening in the foundation wall. This flow of combustion products and cooking vapors is shown by arrows in Figure 2.

When the fan is not in operation there is no suction at slots (15) and (17), hence the combustion products spill into the kitchen area from under apron (13). However, as these products are discharged approximately 15¾ inches from the wall, no streaking of this surface should result.

The combustion products from the oven, broiler and top section striking and traveling along panel (5) supply heat to canopy (6) when the fan is not in operation. When the fan is operating

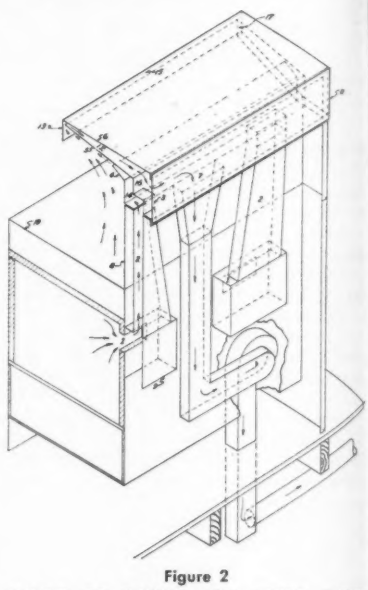


Figure 2

INDEX OF RANGE AND HOOD PARTS. 1. Oven and Broiler Vent Openings (Range). 2. Oven and Broiler Vents (Range). 3. Ell Connection. 4. Panel. 5. Panel. 6. Canopy. 7. Suction Opening. 8. Splasher Panel (Range). 9. Vent Box (Range). 10. Cooking Top (Range). 11. Vertical Rear Side of Suction Manifold. 12. Suction Chamber. 13. Apron. 14. Vent Manifold. 15. Horizontal Suction Slot. 16. Suction Manifold. 17. Vertical Suction Slots. 18. Suction Duct.

these products supply heat to canopy (6) as they are drawn through suction chamber (12). Thus heat is supplied to this surface area [canopy (6)] both when the fan is in and out of operation so that the top of the canopy may be used for warming dishes and keeping cooked food warm under both of the previously mentioned operating conditions.

Performance Characteristics Investigated

A model of this hood design was constructed and installed on a standard model gas range. Using this experimental hood and range combination in con-

junction with a small multi-vane forward curved blade fan, which gave an air throughput of 200 cubic feet per minute, the following performance characteristics were investigated:

(a) Effect of hood on baking performance of the range oven.

(b) Effect of hood on the combustion performance of the range oven.

(c) Efficiency of the hood in removing sensible heat created by the oven burner flame.

(d) Efficiency of the hood in removing water vapor diffused in the oven combustion products (which is probably analagous with efficiency of removing cooking vapors and odors).

(e) Efficiency of the hood in removing sensible heat available as a result of top section cookery.

(f) Efficiency of the hood in removing water vapor created by top section cookery (which is probably indicative also of the efficiency of the hood in removing cooking vapors and odors).

Effect of Hood on Oven Performance

Baking Performance—Four layers of cake were baked in the oven under each of the following conditions: (1) standard range model without a hood, (2) the same range with hood installed but the fan not operating, and (3) the same range with hood installed and fan operating at a throughput of 200 cubic feet per minute.

There was no difference in evenness of browning of the cakes baked under each of the three previously described conditions as indicated both by visual inspection and by a traverse of the top and bottom surfaces of the cakes with a photoelectric reflectometer.

Oven Maintenance Rate and Combustion Performance—Installation of the hood on the standard range model without the fan in operation caused the maintenance rate, necessary to maintain an oven temperature of 400 degrees F. to increase slightly from 5,679 B.t.u. per hour to 5,772 B.t.u. per hour, an increase of only 1.64 percent. When the hood fan was put in operation at a throughput of 200 c.f.m., the maintenance rate was reduced to 5,682 B.t.u. per hour, only 0.05 percent. greater than the maintenance rate for the standard range model without a hood installed.

The only effect on the combustion performance of the oven which resulted from the installation of the hood on the range was a small increase in percent of excess air in the oven combustion products, however, operation of the hood fan did not cause any further increase in excess air.

When the oven was maintained at an equilibrium temperature of 500 degrees F. and the fan throughput was 200 c.f.m., 93 percent of the sensible heat liberated by the oven burner flame was captured by the hood and removed from the range location.

Steam was then introduced into the oven to simulate cooking vapors. The total moisture available in the oven then amounted to the moisture formed as a result of the combustion of the gas required to maintain an oven temperature of 500 degrees F plus the moisture introduced as steam. The hood captured 99.4 percent of the total moisture available in the oven.

A series of tests were conducted on the top section of the range with the four rear burners operating simultaneously at total inputs ranging from 5,800 B.t.u. per hour to 36,000 B.t.u. per hour, or 1,450 to 9,000 B.t.u. per hour per burner. During each test an 8⅞ inch diameter American Gas Association test pan containing boiling water was placed on the grate above each burner. The efficiency of the hood in capturing and removing the sensible heat liberated from the simulated top burner cooking operations described above was determined in each instance. The results of these tests, expressed in percent removal of sensible heat available are shown in Figure 3.

It will be noted that for total gas inputs to the four top burners ranging from 5,800 to 26,000 B.t.u. per hour, or 1,450 to 6,500 B.t.u. per hour per burner, the heat removal efficiency of the hood was in excess of 90 percent. At higher gas inputs the efficiency of the hood decreased approximately 73 percent when the input to the four top burners was 36,000 B.t.u. per hour, or 9,000 B.t.u. per hour per burner.

Efficiency of the hood in removing the moisture evaporated from the test pans and liberated as a result of combustion for each of several tests similar to those previously described is shown in Figure 4. For total inputs to the four burners ranging from 5,200 to 19,000 B.t.u. per hour, the moisture removal efficiency of the hood was approximately 95 percent. As the input to the four top

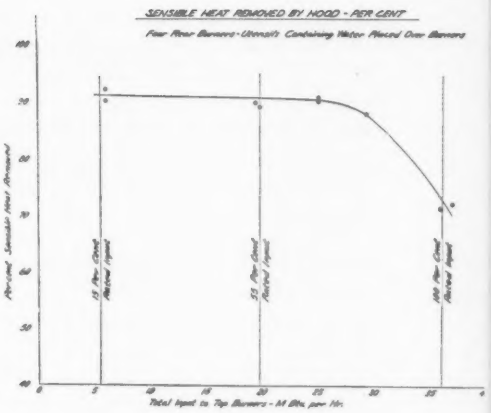

SENSIBLE HEAT REMOVED BY HOOD - PER CENT
Four Rear Burners - Utensils Containing Water Placed Over Burners
Percent Sensible Heat Removed
Total Input to Top Burners - M Btu. per Hr.

Figure 3

burners was increased from 19,000 to 28,000 B.t.u. per hour the moisture removal efficiency of the hood decreased, and was approximately 63 percent at the last-mentioned burner input. As the input to the four burners was still further increased the reduction in moisture removal efficiency was more gradual, being 57 percent at maximum input rating (36,000 B.t.u. per hour).

Efficiencies of the hood in removing odors resulting from top section cooking operations would probably approximate those shown above for moisture removal, as cooking odors could be expected to move and diffuse in a manner similar to water vapor.

Gas Inputs to Burners for Three General Classes of Cooking Operations—Top section cooking operations generally are not performed with a constant gas input to the burners throughout the entire processing period, hence the sensible heat removal efficiencies shown in Figure 3 are not directly applicable, if over-all efficiencies for complete cook-

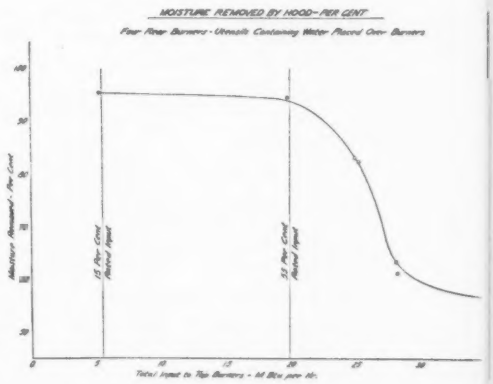

MOISTURE REMOVED BY HOOD - PER CENT
Four Rear Burners - Utensils Containing Water Placed Over Burners
Total Input to Top Burners - M Btu. per Hr.

Figure 4

ing operations are desired. In order to give the reader an approximation of the range of efficiencies that might be expected for complete cooking operations, these operations have been grouped into three general categories and the sensible heat removal efficiencies computed from the test data for each of them.

The most frequently used top section cooking operations require the operation of a burner at rated input for from 10 to 30 percent of the required processing time. The burner is then turned to approximately 15 percent of rated input (simmer input) during the remainder of the processing time (70-90 percent). Such operations will hereafter be referred to as "Cooking Operation Type A."

Efficient Hood

Some less frequently used cooking operations require that the burner be operated at rated input for from only two to ten percent of the processing time, and at approximately 15 percent rated input for the remaining time (90-98 percent). This operation will hereafter be referred to as "Cooking Operation Type B." Other somewhat infrequently used cooking processes require that the burner be operated at an intermediate input of approximately 55 percent rated input for the major portion of the processing time. Hereafter, this operation will be referred to as "Cooking Operation Type C."

Efficiency of Hood in Removing Sensible Heat Resulting from Cooking Operations—Efficiency of the hood in capturing and removing sensible heat given off from the above described cooking operations was computed from data obtained in the heat removal tests. Calculations showed that sensible heat removal efficiencies of 80 percent, 87 percent and 89 percent could be expected for cooking operations Types A, B, and C.

Efficiency of Hood in Removing Moisture Resulting from Cooking Operations—An analysis of the three general classes of top section cooking operations simulated by the above described operations Types A, B, and C, indicated that Type A and B operations usually involve processing in water or water vapor and that during the portion of the processing time when the burner is operated at rated input, little if any of this processing water is evaporated, as during this period the temperature of the water and the product being processed is being raised from room temperature to approximately boiling temperature. The small quantity of water vapor given off is that resulting primarily from the combustion of the fuel.

It is during the remainder of the processing period, when the burner is being operated at simmer input, that the majority of the water vapor and/or cooking vapors are liberated. Hence, the moisture removal efficiency of the hood during the period when the burner is being operated at rated input is of little practical importance. The efficiency of the hood in capturing and removing moisture liberated by cooking operations Types A and B, therefore, may be considered to be approximately the same as shown by the curve in Figure 4, for an input of 5,400 B.t.u. per hour (15 percent rated input) or 95.5 percent.

Cooking operation Type C is somewhat typical of some fast frying operations. Generally in these operations the skillet or griddle is heated before the product is placed on it. Therefore, it is probably appropriate to assume that vapor is being liberated during the entire processing period. If this assumption is correct the moisture removal efficiency of the hood for Type C cooking operations would be approximately 94 percent, as shown by Figure 4, for a burner input of 55 percent rating.

Air Throughput and Electric Power Requirement

An air throughput of 200 c.f.m. appears to be quite adequate in that relatively high efficiency both for heat and moisture removal were obtained with the hood at this throughput. The efficiencies of the hood obtained with a 145 c.f.m. throughput were considerably lower, therefore, a throughput of 200 c.f.m. probably may be considered optimum.

If a fan of average efficiency is used a 1/15 h.p. motor should be adequate to obtain a deliveray of 200 c.f.m. against the frictional resistance of the hood and necessary piping or duct work. The electric consumption of such a motor would be approximately 50 watts per hour.

No tests have been conducted during this investigation to determine whether grease and dust will collect on the inside surfaces of the hood, ductwork or fan parts, however, no such collections of grease and dirt are expected to occur under the conditions of operation prevailing in the average domestic kitchen. Domestic kitchen ventilating systems have been installed in the territory served by the Rochester Gas and Electric Corp., Rochester, N. Y., for a number of years and inspections of some of the first installations made have revealed no appreciable collections of grease and dust on the internal surfaces of these kitchen ventilating systems.

A ventilating system similar to those used in Rochester was installed in the kitchen of a Southern California residence 18 months ago. To date, no grease or dirt has been deposited on the parts of this installation except on the face of the suction grill located in the kitchen wall above the top section of the range, which of course is easy to clean.

It was the author's privilege to inspect several kitchen ventilating systems which had been operated under conditions identical to one year of operation in an average home where three meals a day are prepared. There were no appreciable collections of grease and dirt on the interior surfaces of these ventilating systems.

Tests which have been made on contemporary grease filtering equipment, for use in commercial kitchen ventilating hoods, indicate that the construction of the domestic kitchen ventilating hood described herein is such that any deposits of grease which may occur will be deposited on the porcelain enamelled surfaces on the underside of the hood, where they can be easily removed, rather than on interior surfaces of the hood, ductwork, or fan parts.

Advertising

● A well-known manufacturer of chewing gum made a statement about advertising that pretty well rates tops. While traveling through the West one day, a chance acquaintance on the train said to him, "Everyone knows your gum. It's sold everywhere. Why do you continue to advertise?"

The story goes that the manufacturer turned and said, "My friend, this train is going along very smoothly right now. Do you think we ought to take off the engine?"

—Provincial Paper Limited

Proved Natural Gas Reserves Rise

Joint report by American Gas Association and American Petroleum Institute committees on reserves places the nation's natural gas supply at 165.93 trillion cu. ft.

● Proved natural gas reserves in the United States on December 31, 1947 were 165.93 trillion cubic feet and proved liquid hydrocarbon reserves were 24,741,660,000 barrels, it is estimated in a joint report of the Committees on Reserves of the American Gas Association and the American Petroleum Institute. On December 31, 1946, proved reserves of natural gas were 160.6 trillion cubic feet and total liquid hydrocarbon reserves were 24,036,779,000 barrels.

The statement is the second in a series of joint yearly reports by the two committees marking a new method of estimating the nation's petroleum sources.

New natural gas reserves discovered in 1947 amounted to 3.41 trillion cubic feet while extension of existing fields and revisions of previous reserve estimates for these fields amounted to 7.57 trillion cubic feet. Estimated net production of natural gas for 1947 was 5.63 trillion cubic feet. Of the total proved liquid hydrocarbon reserves 3,253,900,000 barrels were natural gas liquids, compared with revised total proved reserves of natural gas liquids of 3,163,200,000 barrels on December 31, 1946.

In view of the importance of these two reports the MONTHLY has reprinted them below.

* * *

A. G. A. Committee Report

THE American Gas Association's Committee on Natural Gas Reserves herewith submits its annual report, summarizing the proved recoverable reserves of natural gas and natural gas liquids of the United States, as of December 31, 1947.

The scope of the report has been broadened in order to indicate separately that portion of the reserves which resulted from discoveries in 1947 of new fields, and new pools or reservoirs in old fields. These are differentiated from the changes caused by extensions to known pools in 1947 and by revisions due to new information. In the last report, all such changes in the previous year's estimates were grouped together.

Since the natural gas liquids reserves were estimated last year for the first time by this committee, the present report is the first one in which it is possible to show the changes resulting from a year's drilling and production history.

While the present estimates reflect the results of new discoveries, we wish to emphasize that the full significance of a new discovery is seldom apparent in its first year. It will not be until the new fields and new reservoirs are more fully developed, and in some cases, have produced for some time, that they can be correctly appraised.

So that the estimate of reserves may be completed for the year end early in the succeeding year, production figures in some cases are estimated for December. The difference between the December estimate and the actual production is adjusted in the next annual report. The production data in this report reflect the net amounts of natural gas and natural gas liquids taken from reservoirs.

The procedures followed in arriving at and assembling the reserve figures were the same as those used in past reports. The proved reserves may be in either the drilled or undrilled portion of a given field. Where the undrilled areas are considered proved, they are so related to the developed acreage and to the known field geology and structure that their productive ability is considered assured. Recoverable reserves of natural gas are the reserves estimated to be producible under present operating practices. Since the estimates are made by fields, the recovery factors or abandonment pressures used in the calculations were determined by the operating conditions of each individual field. Proved recoverable reserves of natural gas

N. C. McGowen

NATURAL GAS AND PETROLEUM COMMITTEES WHICH ISSUED JOINT REPORT ON RESERVES

A. G. A. Committee on Natural Gas Reserves

N. C. McGowen, United Gas Corp., Shreveport, La., chairman
R. M. Bauer, Southern California Gas Co., Los Angeles, Calif.
R. O. Garrett, Arkansas Louisiana Gas Co., Shreveport, La.
Charles C. Hoffman, Cities Service Gas Co., Oklahoma City, Okla.
Frederick S. Lott, Bureau of Mines, Department of the Interior, Washington, D. C.
W. S. McCabe, Stanolind Oil and Gas Co., Casper, Wyo.
Perry Olcott, Humble Oil and Refining Co., Houston, Texas
E. E. Roth, Columbia Engineering Corp., Pittsburgh, Pa.
Walter E. Caine, American Gas Association, New York, N. Y., secretary

A. P. I. Committee on Petroleum Reserves

F. H. Lahee, Sun Oil Co., Dallas, Texas, chairman
G. Clark Gester (vice-chairman), Standard Oil Co. of Calif., San Francisco, Calif.
R. F. Baker, The Texas Co., New York, N. Y.
L. T. Barrow, Humble Oil & Refining Co., Houston, Texas
D. V. Carter, Magnolia Petroleum Co., Dallas, Texas
Frank R. Clark, The Ohio Oil Co., Tulsa, Okla.
Alexander Deussen, Consulting Geologist, Houston, Texas
J. M. Sands, Phillips Petroleum Co., Bartlesville, Okla.
Theron Wasson, Pure Oil Co., Chicago, Ill.
Fred E. Wood, Standard Oil Co. (Indiana), Chicago, Ill.
Fred Van Covern, American Petroleum Institute, New York, N. Y., secretary

liquids are those contained in recoverable gas reserves and extractable by methods now used in the respective fields.

In the preparation of those estimates, as in those of last year, this committee has had the helpful cooperation of the Committee on Petroleum Reserves of the American Petroleum Institute. To that committee we are indebted in large measure for the estimates of the dissolved gas reserves, which are based on that committee's estimate of crude oil reserves. We gratefully acknowledge the generous help of the A. P. I. Committee on Petroleum Reserves and its sub-groups.

Incorporated in this report are the results of careful study of many hundreds of gas pools throughout the United States. Such an undertaking requires the help of specially trained geologists and engineers familiar with the various producing areas throughout the country. This committee is fortunate in having received the help of such a group of men who have served as subcommitteemen. They have given generously of their information, time and efforts to the end that these estimates might be complete and as accurate and unbiased as possible. This committee expresses its appreciation to these men, and to the many companies and individuals who made available their data and records.

Natural Gas Reserves	
(Trillions of Cubic Feet)	
Total proved reserves as of December 31, 1946	160.58
Extensions, and revisions of previous estimate 7.57	
New reserves discovered in 1947 3.41	
Total proved reserves added in 1947	10.98
Total proved reserves as of December 31, 1946, and new proved reserves added in 1947	171.56
Deduct production during 1947	5.63
Total proved reserves of natural gas as of December 31, 1947	165.93

Reserves data are shown by states in Table 1.

Natural Gas Liquids Reserves	
(Millions of Barrels)	
Total proved reserves as of December 31, 1946	3,163.2
Extensions, and revisions of previous estimate 192.2	
New reserves discovered in 1947 59.3	
Total proved reserves added in 1947	251.5
Total proved reserves as of December 31, 1946 and new proved reserves added in 1947	3,414.7
Deduct production during 1947	160.8
Total proved reserves of natural gas liquids as of December 31, 1947	3,253.9

Reserves data are shown by states in Table 2.

A. P. I. Committee Report

As will be recalled, beginning with our report for December 31, 1946, the estimates presented on proved liquid hydrocarbon reserves were expanded to include not only crude oil, but also all classes of natural gas liquids. The figures on crude oil were prepared by the

Table 1—Estimated Proved Recoverable Reserves of Natural Gas in the United States
(Millions of Cubic Feet—14.65 psi Absolute Base)

	Reserves as of December 31, 1946	*Changes in Reserves During 1947*[b] *Extensions and Revisions*	*Discoveries of New Fields and New Pools in Old Fields*	*Net Production*[c]	*Reserves as of December 31, 1947*[b] *Total*	*Non-Assoc.*[d]	*Assoc.*[e]	*Dissolved*[f]
Alabama	97	503	——	76	524	——	——	524
Arkansas	871,662	50,926	29,940	62,379	890,149	455,278	155,408	279,463
California	11,126,301	(—)460,302	58,251	559,894	10,164,356	3,088,452	2,951,684	4,124,220
Colorado	315,763	11,906	15,238	11,041	331,866	174,939	40,771	116,156
Illinois	268,000	(—)5,832	7,770	48,807	221,131	5,526	25,000	190,605
Indiana	17,000	(—)1,000	——	3,000	13,000	4,000	4,000	5,000
Kansas	13,680,844	1,090,607	24,877	239,412	14,556,916	14,155,560	212,612	188,744
Kentucky	1,386,000	88,480	——	95,000	1,379,480	1,299,480	——	80,000
Louisiana	22,411,511	1,164,711	590,878	685,867	23,481,233	18,697,916	3,264,720	1,518,597
Michigan	131,000	38,008	36,881	37,420	168,469	124,339	——	44,130
Mississippi	2,370,513	65,536	71,877	55,166	2,452,760	1,831,826	390,222	230,712
Missouri	55	——	——	1	54	54	——	——
Montana	853,401	(—)165,947	49,255	36,199	700,510	469,515	200,245	30,750
Nebraska	1	809	——	160	650	——	——	650
New Mexico	5,904,786	6,293	311,365	232,161	5,990,283	3,126,494	2,111,027	752,762
New York	69,900	1,000	——	6,000	64,900	64,100	——	800
Ohio	614,000	71,200	——	74,000	611,200	571,200	——	40,000
Oklahoma	10,735,845	272,040	967,265	624,286	11,350,864	7,752,994	1,896,068	1,701,802
Pennsylvania	503,000	56,063	——	76,000	483,063	435,313	——	47,750
Texas	86,363,459	4,960,772	1,205,496	2,504,161	90,025,566	64,971,473	16,308,314	8,745,779
West Virginia	1,840,000	163,735	——	223,000	1,780,735	1,685,235	——	95,500
Wyoming	1,035,597	164,536	41,077	49,422	1,191,788	771,115	130,448	290,225
Miscellaneous[a]	77,166	(—)3,390	——	6,359	67,417	66,670	——	747
Total	160,575,901	7,570,654	3,410,170	5,629,811	165,926,914	119,751,479	27,690,519	18,484,916

[a]Includes Utah and Florida.
[b]Excludes shrinkage caused by natural gas liquids recovery.
[c]Net production equals gross withdrawals less gas reinjected into underground reservoirs.
[d]Non-associated gas is free gas not in contact with crude oil in the reservoir.
[e]Associated gas is free gas in contact with crude oil in the reservoir.
[f]Dissolved gas is gas in solution with crude oil in the reservoir.

A. P. I. Committee and the figures on natural gas liquids were prepared by the A. G. A. Committee, in cooperation with the A. P. I. Committee. For the present report, the same procedure has been followed.

As of December 31, 1947, the committee estimates that the proved reserves of crude oil in the United States amounted to 21,487,685,000 barrels. The natural gas liquids totaled 3,253,975,000 barrels, making a grand total of 24,741,660,000 barrels of liquid hydrocarbons.

TABLE A

(a) CRUDE OIL—AMERICAN PETROLEUM INSTITUTE

(Barrels of 42 U. S. Gallons)

Total proved reserves of crude oil as of December 31, 1946		20,873,560,000
Revisions of previous estimates	+749,278,000	
Extensions of old pools	1,269,862,000	
New reserves (new pools) discovered in 1947	445,430,000	
Proved reserves added in 1947		2,464,570,000
Total proved reserves as of December 31, 1946 plus new proved reserves added in 1947		23,338,130,000
Less production during 1947		1,850,445,000
Total proved reserves of crude oil as of December 31, 1947		21,487,685,000
Increase in crude oil reserves since December 31, 1946		614,125,000

(b) TOTAL LIQUID HYDROCARBONS—A. P. I. & A. G. A.

(Barrels of 42 U. S. Gallons)

Total proved reserves as of December 31, 1946		24,036,779,000
Revisions of previous estimates and extensions of old pools	+2,211,377,000	
New reserves (new pools) discovered in 1947	504,731,000	
Proved reserves added in 1947		2,716,108,000
Total proved reserves as of December 31, 1946 plus new proved reserves added in 1947		26,752,887,000
Less production during 1947		2,011,227,000
Total proved reserves of liquid hydrocarbons as of December 31, 1947		24,741,660,000
Increase since December 31, 1946		704,881,000

The estimates in this report, as in all previous annual reports of this committee, refer solely to proved or blocked-out reserves. They include only oil and natural gas liquids recoverable under existing economic and operating conditions.

The estimates made for this report do not include:

1. Oil* under the unproved portions of partly developed fields.
2. Oil in untested prospects.
3. Oil that may be present in unknown prospects in regions believed to be generally favorable.
4. Oil that may become available by secondary-recovery methods from fields where such methods have not yet been applied.
5. Oil that may become available through chemical processing of natural gas.
6. Oil that can be made from oil shale, coal, or other substitute sources.

Proved reserves are both drilled and undrilled. The proved drilled reserves, in any pool, include the oil estimated to be recoverable by the production systems now in operation, whether primary or secondary, and from the area actually

* The word "oil" unless defined as crude oil, is used in this report as essentially equivalent to liquid hydrocarbons.

TABLE 2—ESTIMATED PROVED RECOVERABLE RESERVES OF NATURAL GAS LIQUIDS[a] IN THE UNITED STATES

(Thousands of Barrels)

	Reserves as of December 31, 1946	*Changes in Reserves During 1947*			*Reserves as of December 31, 1947*			
		Extensions and Revisions	*Discoveries of New Fields and New Pools in Old Fields*	*Net Production*	*Total*	*Non-Assoc.*	*Associated*	*Dissolved*
Arkansas	61,600	(—)264	768	3,845	58,259	37,638	7,864	12,757
California	308,272	28,364	432	24,917	312,151	36,900	115,605	159,646
Colorado	2,377	5,565	—	—	7,942	—	1,482	6,460
Illinois	34,200	(—)12,313	39	4,006	17,920	28	125	17,767
Indiana	85	(—)5	—	15	65	20	20	25
Kansas	82,492	7,786	159	1,625	88,812	85,315	2,553	944
Kentucky	16,071	711	—	1,438	15,344	15,344[b]	—	—
Louisiana	419,396	54,192	9,267	20,041	462,814	355,903	91,725	15,186
Michigan	655	466	184	240	1,065	624	—	441
Mississippi	53,233[c]	4,220	1,796	590	58,659	25,611	30,741	2,307
Montana	8,534	(—)7,038	—	136	1,360	—	—	1,360
New Mexico	73,609	16,065	58	3,810	85,922	26,414	30,443	29,065
Ohio	1,714	189	—	167	1,736	1,736[b]	—	—
Oklahoma	68,317	83,986	17,952	15,252	155,003	61,464	36,464	57,075
Pennsylvania	2,309	242	—	315	2,236	2,236[b]	—	—
Texas	1,985,606	23,568	28,646	80,757	1,957,063	1,259,270	275,582	422,211
West Virginia	19,285	1,713	—	3,477	17,521	17,521[b]	—	—
Wyoming	25,458	(—)15,422	—	136	9,900	1,900	—	8,000
Miscellaneous[d]	6	212	—	15	203	203[b]	—	—
Total	3,163,219[c]	192,237	59,301	160,782	3,253,975	1,928,127	592,604	733,244

[a] Includes condensate, natural gasoline, and liquefied petroleum gases.
[b] Not allocated by types, but occurring principally in column shown.
[c] Revised.
[d] Includes Alabama, Florida, New York and Utah.

drilled up on the spacing pattern in vogue in that pool. The proved undrilled reserves, in any pool, include reserves under undrilled spacing units which are so close, and so related, to the drilled units that there is every reasonable probability that they will produce when drilled.

Part of Reserves

In the case of new discoveries, which are seldom fully developed in the first year and in fact for several years thereafter, the estimates of proved reserves necessarily represent but a part of the reserves which may ultimately be assigned to the new reservoirs discovered each year. For a one-well field, where development has not yet gone beyond the discovery well, the area assigned as proved is usually small in regions of complex geological conditions but may be larger where the geology is relatively simple.

In a sparsely drilled field the area between wells is only considered to be proved if the information regarding the geology of the field and the productive horizon is adequate to assure that such area will produce when drilled. The total of new oil through discoveries estimated as proved in any given year is comparatively small, and the total of new oil through extensions is comparatively large. As knowledge of the factors affecting production and well performance become available, and as these factors are studied, reserves in older fields can be estimated with greater precision and revised accordingly. Therefore, the oil assigned to new discoveries, plus the oil proved through extensions, comprises the total quantity of the new proved reserves for the year.

The committee again wishes especially to stress the fact that its estimates of proved reserves cannot be used as a measure of the rate at which these reserves can be produced with or without physical waste. Oil cannot be produced from the permeable rocks in which it occurs at any desired rate, because the flow of oil through the pores of the oil-bearing rocks is definitely controlled by the physical factors of the reservoir. As a matter of fact, today's known oil can be recovered only over a period of many years and at gradually declining annual rates. This has been widely demonstrated by past performance under all kinds of operating conditions. Therefore, only incorrect conclusions as to the life of these reserves can be obtained by dividing these reserves by the current rate of production.

For comparative purposes we append a summary (Table C) of the over-all figures contained in the committee's annual reports covering the period from 1937-1947, inclusive. Figures for 1935 and 1936, which were the first developed by the committee, are not available separately.

As in the past, this committee wishes to emphasize the fact that every effort has again been made to secure a fair, unprejudiced, *(Continued on page 46)*

TABLE C—SUMMARY OF COMMITTEE'S ANNUAL REPORTS COVERING PERIOD 1937–1947
(Barrels of 42 U. S. Gallons)

Year	New Oil Found During Year: Through Revisions of Previous Estimates and Extensions to Known Fields	New Oil Found During Year: Through New Pools Discovered During Year	Total Through New Discoveries, Extensions and Revisions	Production During Year	Estimated Proved Reserves as of End of Year	Increase Over Previous Year
PROVED RESERVES AS REPORTED PRIOR TO 1946						
1936	——	——	——	——	13,063,400,000	——
1937	2,792,790,000	928,742,000	3,721,532,000	1,277,664,000	15,507,268,000	2,443,868,000
1938	2,243,571,000	810,493,000	3,054,064,000	1,213,186,000	17,348,146,000	1,840,878,000
1939	2,058,455,000	340,667,000	2,399,122,000	1,264,256,000	18,483,012,000	1,134,866,000
1940	1,607,012,000	286,338,000	1,893,350,000	1,351,847,000	19,024,515,000	541,503,000
1941	1,538,989,000	429,974,000	1,968,963,000	1,404,182,000	19,589,296,000	564,781,000
1942	1,618,925,000	260,051,000	1,878,976,000	1,385,479,000	20,082,793,000	493,497,000
1943	1,202,368,000	282,418,000	1,484,786,000	1,503,427,000	20,064,152,000	(—)18,641,000
1944	1,556,192,000	511,308,000	2,067,500,000	1,678,421,000	20,453,231,000	389,079,000
1945	1,690,315,000	419,984,000	2,110,299,000	1,736,717,000	20,826,813,000	373,582,000
December 31, 1945 Estimated Proved Reserves of Crude Oil only (see note below)					19,941,846,000	
PROVED RESERVES AS REPORTED FOR 1946 AND THEREAFTER						
Crude Oil Only						
1946	2,413,628,000	244,434,000	2,658,062,000	1,726,348,000	20,873,560,000	931,714,000
1947	2,019,140,000	445,430,000	2,464,570,000	1,850,445,000	21,487,685,000	614,125,000
Natural Gas Liquids Only						
1946	(..... This detail not available for 1946 .....)				3,163,219,000	——
1947	192,237,000	59,301,000	251,538,000	160,782,000	3,253,975,000	90,756,000
Total Liquid Hydrocarbons						
1946	(..... This detail not available for 1946 .....)				24,036,779,000	——
1947	2,211,377,000	504,731,000	2,716,108,000	2,011,227,000	24,741,660,000	704,881,000

NOTE: Up to and including its figures on Proved Reserves of Petroleum as of December 31, 1945, the committee combined under that heading the estimated proved reserves of cycle-plant and lease condensate. As of December 31, 1945, the reserves so included totaled 884,967,000 bbl. and as of December 31, 1944 there were 668,701,000 bbl. included. Beginning with the report of December 31, 1946, the figures in this table show crude oil and natural gas liquids. It is to be remembered that, previous to December 31, 1946, not all classes of natural gas liquids were included. For this reason the totals for crude oil and natural gas liquids, as herewith recorded for 1946 and 1947, are not comparable with the figures recorded for years prior to 1946.

Space limitations prevent the printing of Table B showing estimated proved reserves of crude oil by states.

ACCOUNTING SECTION

JOHN A. WILLIAMS, Chairman L. E. REYNOLDS, Vice-Chairman WALTER E. CAINE, Secretary

Bulk Proof of Cash Receipts

● **The following article written exclusively for the MONTHLY was obtained through the cooperation and assistance of Arthur W. Fyfe, Consolidated Edison Co. of New York, Inc., coordinator, Customer Accounting Activities Group.**

By GEORGE J. BESWICK and HARRY G. LITTLEWORT

Commercial Relations Department, Consolidated Edison Co. of N. Y., Inc.

OUR subject entails a description of operations which provide a method for handling cash coupons received from various sources through a central point where they are summarized to balance with the corresponding daily total of bank deposits, and also their preparation for posting to a tabulating card accounts receivable record.

This method has the following primary objectives:

1. Progressive accumulation from the various sources of "unit" totals of cash, each "unit" being an "accounting unit" embracing approximately 170,000 accounts.

2. Accumulation of "unit" totals from the various sources daily to secure the total cash figure *without a final adding machine tape listing of all cash coupons.*

3. Arrangement of cash coupons in strict account number order each day *principally during the slack periods of each day* between the arrival of the cash coupons from the principal sources, i.e., mail, collectors, district offices, on the premise that the sorting of cash coupons into account number sequence to facilitate cash posting is more economical than "random posting" or "posting by source."

4. Operation of a single machine-tabulated listing of paid cards to provide a complete listing and all necessary control totals and summary cards without any preliminary "source" or "batch" tabulations.

Following is a description of the preparation and accumulation of the "unit" totals for the various sources of cash coupons and the final tabulating reconciliation operation for the complete day's cash receipts.

All cash coupons and remittances are sorted into "accounting unit" order. The cash coupons are listed by "units" and the total balanced against the total remittances which are also listed in "unit" order.

"Unit" totals are then posted to the Cash Source Summary Form No. 15 (Exhibit No. 1) and totaled to provide the Mail Cash Source Total. The cash coupons are then racked according to "accounting unit" and ledger order.

Miscellaneous Receipts

The term "miscellaneous receipts," as used here, applies to payments covering more than one account, the accounts being located in different accounting units and payments covering wholesale accounts. The miscellaneous mail coupons and remittances are listed separately in order to secure and prove the Miscellaneous Cash Source Total. The proven transfer totals are taken intermittently after which the cash coupons are sorted into accounting unit order. When the day's mail is closed, the miscellaneous cash coupons are listed according to "unit" order and the totals are then posted to the Cash Source Summary Form (Exhibit No. 1). These Cash Source Summary Forms are then balanced against the Miscellaneous Cash Source Total mentioned previously. Thereupon the miscellaneous cash coupons are sorted in ledger order and racked with the mail receipts coupons from which they are separated by cardboard dividers.

Collectors' Receipts

Collectors sort their paid cash coupons in "unit" and ledger order and list the cash coupons to secure the totals by "units" and a grand total to balance each collector's cash report. The collectors then post the "unit" totals and the grand total to a Cash Source Summary Form which is turned in to a receiving teller with the cash receipts. The correctness of each collector's cash total is certified by the teller.

The receipts unit cross-adds all collectors' "unit" totals and grand totals on a

Exhibit Number 1

C. E. CO. OF N. Y., INC.

CASH SOURCE SUMMARY

COMM. CENTER_____

SOURCE OF CASH_____

DATE OF CASH_____

	UNIT NO.	AMOUNT
	1	
	2	
	3	
	4	
	5	
	WHOLESALE AND SPECIAL ACCTS.	
	APPLIANCES	
	DEPOSITS	
	OTHER DISTRICTS AND OTHER CO'S.	
	TOTAL	

ENTERED BY_____

CERTIFIED BY_____

1-10 (PAD) 10M 8-47 COMM. REL.

COMMERCIAL OPERATIONS -

RECEIPTS RECAPITULATION

DATE _____

	Electric		Gas		Total	
Sundry Customers						
Customers Deposits						
Appliance Sales						
Comm'l Relations Dept Misc						
Total						
Westchester Lighting						
Grand Total						

Balanced _____ _____

Over _____ _____

Short _____ _____

Prepared by _____ Commercial Cashier

DISTRIBUTION

	Electric		Gas		Total	
Sundry Customers						
Customers Deposits						
Appliance Sales						
Comm'l Relations Dept Misc						
Total						
Westchester Lighting						
Miscellaneous						
Grand Total						

Man. Br. Bklyn. Queens

Supervisor Journal Control Unit

Exhibit Number 2

final Collectors' Cash Source Summary Form, thus proving all of the underlying totals and balancing the total source figure with the receiving tellers' totals of cash receipts from all of the collectors. When the Collectors' Cash Source Summary has been proved, the receipts unit racks the cash coupons by ledgers with the mail and miscellaneous payments coupons, each source group still being separated by cardboard dividers.

District Office Receipts

District office tellers rack the cash coupons in "accounting unit" order as the payments are received. At the close of the day they are listed to secure totals by "units" and a grand total of all "units," thus balancing the teller's receipts for the day. Each teller posts the "unit" totals and the grand total to a Cash Source Summary Form, the correctness of which is verified by the district office cashier. Each district office cashier accumulates the "unit" totals and grand totals of the tellers' Cash Source Summary Forms and balances them against the daily total of cash to be reported. Each teller's cash coupons, sorted in "unit" order, are then sent to the receipts unit with the Cash Source Summary Forms.

The receipts unit re-lists each teller's coupons, verifying the "unit" totals and cross-adds all of the "unit" totals and grand totals. This unit posts the results to a final Cash Source Summary Form for each district office and balances the total source figure against the total reported by each district office cashier.

When the cash summary for each district office has been verified, the receipts unit racks the cash coupons in ledger order on top of all of the other coupons previously racked but separated from the others by cardboard dividers, but not separated as to district office or tellers.

Total Cash Balance

At this point the receipts unit cross-adds the proven total mail, total collectors, individual district offices and total miscellaneous Cash Source Summary Forms, thus securing the grand total of all cash coupons by "units" and the grand total of cash coupons for all "units" which must balance with the total cash receipts reported as deposited in banks from all sources for the day. A grand total Cash Source Summary Form is then prepared in duplicate—the original retained by the commercial cashier and the duplicate sent to the journal control unit accompanied by a copy of the Receipts Recapitulation Form (Exhibit No. 2). The total cash figure for each accounting unit is transcribed to an Accounting Unit Cash Transfer Form (Exhibit No. 3) in the space provided and captioned "unit total."

At this time any cash coupons which have been missorted and listed under the wrong accounting unit will be transferred to the correct unit in accordance with the procedure prescribed for handling such cases.

When the total day's receipts have been balanced and any missorted coupons have been transferred, the cash coupons are inter-sorted in account number order and stapled in bookkeeping groups, each of which handles approximately 20,000 accounts. The non-payment turn-off orders are then checked against the coupons and those orders affected by the current day's payments are eliminated. All cash coupons, accompanied by the Accounting Unit Cash Transfer Forms with any missorted coupons attached, are sent to the accounting units before 8 A.M. of the following day for posting.

Cash Posting

Upon receipt of the cash coupons in the accounting units, the Accounts Receivable Tabulating Cards are "pulled" and the cards kept in strict sequence order with the cash coupons. After the preparation and proof of any credit or split payment cards, the on-account cards are verified by the bookkeeper and inserted in their proper position in the paid cards. The balance cards or credit cards are filed in the Accounts Receivable Card file.

Any transfers in and out of a bookkeeping group are posted to a Group Cash Transfer Form (Exhibit No. 3) to secure additions to or deductions from the

group totals. Any cash coupons which may be attached to the Accounting Unit Cash Transfer forms, due to having been listed under the incorrect unit by the receipts unit, are placed in the front portion of the day's cash after the bookkeeper has issued the necessary Transfer Coupons.

The separate Group Cash Transfer Forms are consolidated onto the Accounting Unit Cash Transfer Form which was prepared by the receipts unit. The Accounting Unit Cash Total is adjusted to give effect to the transfers reported by the various groups and to any mis-sorts. All additions and deductions are verified by the accounting unit supervisor. The Group Transfer Sheets are then stapled to the Unit Cash Transfer Sheet and forwarded to the tabulating division with the cash coupons and withdrawn cards.

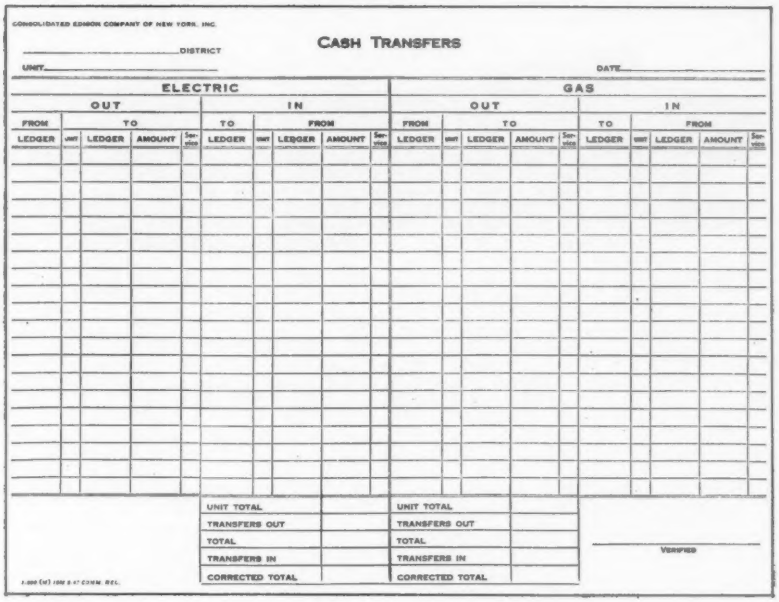
Tabulating Operations

Completed cash received from the accounting units is listed by a numeric tabulator which coincidently supplies a total cash figure for each ledger by group and imprints each card as follows: "Month, Day, Year Pd." (Exhibit No. 4). When the listing of the paid cards for all of the groups in a "unit" is completed, the Ledger Paid Cash Summary Cards for the "unit" are listed to secure a resume total of the paid cards for the "unit."

The detail cash listings, the summary cards and the resumes of the summary cards for each accounting unit are verified in the machine billing unit which certifies the agreement of the "unit" cash total with the adjusted "unit" total cash as reported by the "unit" on the Unit Cash Transfer Form, reconciling and correcting any cash posting errors and making any necessary corresponding corrections of Cash Listings and Corresponding Ledger Total Summary Cards. In those cases where changes in Cash Listings, paid cards, or summary cards are necessary, a revised resume of summary cards is made to assure that all of the necessary changes have been made correctly and the correct resume is so certified.

When the cash reconciliation has been completed, the "unit" and group Cash Transfer Forms and the certified resume of cash summary cards, by "unit," are referred to the journal control unit.

The journal control unit accumulates the certified unit cash totals for all "units," Uncollectible Bill Payments, and any other general account classification of cash receipts which are necessary in order to balance back to the commercial cashier's total cash receipts figure required for the completion of the Receipt Recapitulation Form. The certified Ledger Cash Summary Cards are reproduced to Detail Journal Entry Cards which serve as journal entries for cash credits to the Accounts Receivable Control.

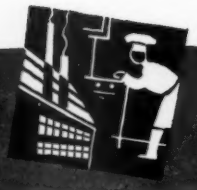

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

CASH TRANSFERS

_____ DISTRICT

UNIT_____ DATE_____

ELECTRIC										GAS									
OUT					IN					OUT					IN				
FROM	TO				TO	FROM				FROM	TO				TO	FROM			
LEDGER	UNIT	LEDGER	AMOUNT	SERVICE	LEDGER	UNIT	LEDGER	AMOUNT	SERVICE	LEDGER	UNIT	LEDGER	AMOUNT	SERVICE	LEDGER	UNIT	LEDGER	AMOUNT	SERVICE



INDUSTRIAL & COMMERCIAL GAS SECTION

LEON OURUSOFF, Chairman BERNARD T. FRANCK, Vice-Chairman MAHLON A. COMBS, Secretary

A Tale Between Two Cities

I WAS sitting in the club car of the Congressional Limited, coming back from Washington recently, when in walked my friend, Jack.

"Hi, Jack, how's the saloon business?"

"Always insulting!" he said.

"No offense meant, Jack, but I have to deflate your plush-lined bistro a little. Sit down, anyway.

"Steward," I beckoned, "take care of this gentleman."

Over our glasses, we talked of this and that, and more or less naturally, our conversation drifted around to eating places. Jack runs a very nice place in New York's East 40's and is doing very well.

"What's new in the gas business?" Jack asked.

I said, "Oh, there's nothing new—everybody still cooks with gas; at least almost everybody does."

Customers

● A Customer is the most important person ever in this office . . . in person or by mail.

A Customer is not dependent on us . . . we are dependent on him.

A Customer is not an interruption of our work . . . he is the purpose of it. We are not doing him a favor by serving him . . . he is doing us a favor by giving us the opportunity to do so.

A Customer is not an outsider to our business . . . he is a part of it.

A Customer is not a cold statistic . . . he is a flesh-and-blood human being with feelings and emotions like your own, and with biases and prejudices.

A Customer is not someone to argue or match wits with. Nobody ever won an argument with a customer.

A Customer is a person who brings us his wants. It is our job to handle them profitably to him and to ourselves.

—*Paul T. Babson*

By A COMMERCIAL GAS MAN

"I hear there are still some die-hards," Jack said.

"Oh, yes," I answered, "here and there, but they are gradually seeing The Light and becoming converted."

"I suppose you've been in Washington preaching the advantages of gas cooking," Jack continued.

"No," I said, "I don't have to; the boys find it out for themselves."

"Well, Mr. Gas Man, by the glint in your eye, I'll bet you've come back with a good story and are just dying to tell somebody about it. You haven't been down there for your health. O.K., son, you can tell me."

"Did you ever hear of Alfonso's Restaurant?" I asked.

"No," he said, at which I was very much surprised, because I thought everybody who had ever been to Washington had eaten there.

"Jack, my boy," I continued, "any time you want as good food as you serve yourself, go to Alfonso's.

"Sit back, Jack," I went on, "hold on to your glass, and listen to a very interesting tale."

I had just come from Alfonso's, and the story was fresh in my mind.

"This fellow Alfonso in the flesh is really Alfons Grubhofer, who worked in famous establishments in Italy, Switzerland, Austria and Germany as an apprentice, after which he was chef on various ocean liners. On coming to this country about 20 years ago, he was chef at some swanky Florida restaurants until 1943 when he opened his own restaurant in Washington. He sure picked himself a good location."

Jack interrupted me at this point, "Would you know a good location when you saw one?"

"No," I said, "but Alfons did. He's right on 'L' Street near Fourteenth which is practically around the corner from the Statler and near several other popular hotels. His place is very nice and homelike, in one of those remodeled ageless buildings of which Washington has so many.

"Right from the start, his restaurant clicked because he served good food. Let me tell you, Jack, I'm a pretty particular fellow, and when I say he has good food, I mean it is good, and I'd say his place is a success.

"But, like all other restaurants," I continued, "during the war there was a scarcity of help, and what help he had was awfully particular about existing conditions. He had fairly good gas equipment in his kitchen; then one day a smart fellow came in and sold him a real bill of goods in the form of heavy duty electric cooking equipment."

Bill of Goods

Jack looked at me, drained his glass, and started to laugh.

"As many times as you have been down there," he said, "how could you let him get in ahead of you?"

"I don't know," I answered, "—just one of those things, that."

After some moments, Jack said, "Go on, Mr. Gas Man. What happened?"

"Plenty," I replied, "I was having dinner with a group at Alfonso's one evening about six months after he had installed his electric equipment. As far as the food was concerned, I wouldn't know the difference—it was still good. The perfect host that Alfons is, he came over to our table, had some nice polite conversation and asked me if I was going to be in town for a few days and could I come around to see him some morning.

"I did the next day." "And did Alfons cry on my shoulder! I asked what was the matter—did his cook leave? He said, 'No,

but he's liable to if I don't do something.' "

"Don't tell me any more," said Jack, holding his head between his hands, "I have a chef, too!"

"Yes," I agreed, "but Alfons' trouble was that his chef had to come in hours earlier to prepare several of the specialties, which cost money in overtime. And that wasn't Alfons' main trouble!

"He took me into his office," I continued, "and got out a lot of bills, both gas and electric. Here was where I got out my pencil and made copious notes.

"From those bills, I figured some costs which you might be interested in, Jack, because he serves about the same number of meals that you do.

"From November 20, 1945 to March 18, 1946, when his original gas equipment was there, for 118 days of good business, his total cost for gas to cook with and for miscellaneous purposes was $365.66, and the way I do arithmetic, it amounted to $3.10 a day. Mind you, that's for gas cooking and other purposes! For cooking, alone, gas cost $1.70.

"So," I went on, "I told him that's not bad, that's good.

"Then, Jack, I figured out from November 12, 1946 to March 3, 1947, after the electric equipment was installed, he spent $775.68 for cooking, light and power. That was for 111 days, which meant $7.00 a day. It looked awfully bad to him, so I said, 'Hey, we must take the light and power out of this!" So I figured that out, which amounted to $1.76 a day, which I took away from the seven dollars, and that made $5.24 a day which it cost to cook with electricity, as against the $1.70 it cost to cook with gas, an increase of $3.54 per day, which is over 300 percent!

"Well, Jack, he didn't like that a bit, because when you add that up year after year, it makes a big hole in the profit."

By that time, our glasses were empty again, and we had to get another re-fill. Jack brought me back with the remark, "Go on with your story. I want to hear the happy ending."

"Yes, it did have a happy ending," I replied, "and this is the way it worked out. Evidently some of the stove manufacturers had really gotten busy and worked out a deal whereby Alfons sold his electric equipment and purchased nice new modern heavy duty gas appliances.

"The new equipment consisted of one open top section with an oven below, one closed top section with an oven below, two broilers with ovens above, and a large deep fat fryer, which is certainly enough to handle his business. This equipment was put in during his organization's annual vacation period and during the time the gas service in his neighborhood was changed over to natural gas.

"His chef is very happy now, because his kitchen is cooler, he does all his cooking much more quickly, and he can go back to his old routine of leaving his stock kettles on the stove overnight to simmer and be ready for the next day's business.

"I had Alfons get out his bills for gas service with the new equipment in use, on natural gas, and here is what I found. His electric bills for light and power were right back where they were originally when he opened the place, and his gas bill for a 31-day period, November 21, 1947 to December 22, 1947, was $88.74, or $2.86 per day, of which $1.46 went for cooking, which is substantially less than the previous average daily cost of $1.70. This difference can be accounted for in the brand new fully insulated modern equipment which he just had put in.

"You know, Jack," I remarked, "there are a lot of places that could save themselves money by modernizing their kitchens with the new gas equipment that is available today.

"I told Alfons that I was going to write up this story, and he asked me to say that he was very much pleased with the new installation because it gave greater speed on cooking tops; improved oven performance; improved quality of broiled foods; had greater broiler speed; greater flexibility, particularly when simmering soup stock and other operations requiring close control; less effort required on the part of his chefs to obtain necessary production; a cooler kitchen; and a two-thirds reduction in the cost of his fuel for cooking. In addition, Alfons stated that he now realizes the true meaning of the slogan 'NOW YOU ARE COOKING WITH GAS.' "

"Well, that certainly was an interesting story," said Jack, "and you don't have to worry about me when I need any replacement in my equipment. It'll be GAS."

"Looks like we're getting to Newark," I said. "Guess I'd better go up ahead and get my belongings. I'll be seeing you."

A. G. A. to Exhibit At Foundry Show

INDUSTRIAL gas men are reminded of the fact that the American Gas Association will be represented by a reception center (booth 1022) at the fifty-second annual Convention and Exhibit of the American Foundrymen's Association in the Philadelphia Convention Hall, May 3-7.

A. G. A. will have as neighbors, Fisher Furnace Division, Lindberg Engineering Company (booth 1020), and Young Brothers (booth 1024). Also exhibiting will be Despatch Oven Company (booth 1109).

Carl Wierum, The Brooklyn Union Gas Co., chairman, A. G. A. Metals Committee, has announced that the A. G. A. Non-Ferrous Subcommittee, W. Wirt Young, Waterbury, Conn., chairman, will hold a meeting during the Foundry Show.

Modern electric kitchen equipment formerly used in Alfonso's Restaurant

This brand new fully insulated heavy duty gas equipment cut down fuel bills

RESIDENTIAL GAS SECTION

C. S. STACKPOLE, Chairman | W. M. JACOBS, Vice-Chairman | F. W. WILLIAMS, Secretary

Sales Ideas Viewed at Pittsburgh

Irving K. Peck, The Manufacturers Light & Heat Co., Pittsburgh, conference chairman

COMPLACENCY can prove to be one of the greatest foes of the gas industry, H. Carl Wolf, managing director, American Gas Association, told 300 sales executives and representatives gathered at the A. G. A. Eastern Natural Gas Regional Sales Conference at the Hotel William Penn, Pittsburgh, March 10.

Competition from other fuels, from other appliances and from other products is gaining in the battle for the consumer dollar, Mr. Wolf declared. Planned selling is the answer to many of the industry's problems, he said. For successful selling he recommended a simple prescription which he labeled The Three P Prescription—Plan—Pick—Push. Planning a sales campaign; picking salesmen carefully, and pushing these men and the use of modern, automatic appliances would restore any ailing utility company to robust health, Mr. Wolf prescribed.

W. D. Williams, Public Service Electric & Gas Co., Newark, N. J., chairman, A. G. A. Water Heating Committee, said that advancement had been made in the usage of gas water heaters during the past decade. A constant supply of hot water was considered a luxury ten years ago, but today with automatic washers, dishwashers, and increased use of water for health and sanitation, the 20-gallon heater is practically outmoded.

Sizing of water heaters should be regarded in the light of ten years ahead, Mr. Williams said. He advocated better education of housewives on the control of water temperature achieved with gas as a fuel and recommended that thermostats for water heaters be placed in the living room or kitchen of homes. Controls for househeating and modern cookery are placed at the convenience of the user, he added, and water heating tmperature controls should be just as available for the use of the consumer.

Harold E. Jalass, general sales manager, Cribben & Sexton Co., Chicago, told the conference there is no real consumer resistance to modern, automatic gas ranges. What is needed, he said, is a better understanding of our product-gas, with its flexibility and qualities of speed, cleanliness, and convenience. A new group of appliance salesmen has evolved in department stores, appliance stores, and dealer organizations, and this group must be educated and shown that point by point, the automatic gas range has everything today's customers want.

Sell Leadership

The gas utility industry may be missing many opportunities for increasing its stature in public opinion, Joseph C. Bevis, Opinion Research Corp., suggested. Since these utilities render excellent service there is little opportunity to meet customers face-to-face. No industry can grow and prosper over the long run without public understanding and active good will. He said that a gas utility is vulnerable because it is a public utility, and must not only sell

Session chairmen and speakers at Pittsburgh sales conference: (left to right) chairmen—Raymond Little, Equitable Gas Co., G. L. Scofield, Republic Light, Heat & Power Co., H. Leigh Whitelaw, G. A. M. A.; speakers—Irene L. Muntz, Rochester Gas & Electric Corp., and R. J. Miller, The Ohio Fuel Gas Co.

its product but also must sell its leadership in the community it serves.

John T. Knighton, Servel, Inc., Evansville, Ind., in a brief discussion substituted for the scheduled Servel skit, stressed the necessity for planned selling of gas and gas appliances. In some areas the transition from a buyer's to a seller's market already has taken place, he said. A slump may arrive unannounced when national buying interest declines unless management has planned for such a transition.

Irene L. Muntz, home service director, Rochester Gas & Electric Corp., Rochester, N. Y., presented an interesting paper on new activities being developed in home service departments to meet the new needs of consumers.

An entertaining presentation of selling techniques and efficiency was made by Assistant Professor J. H. Davis and three graduate members of the business organization department, Ohio State University. Working from a time study made of salesmen's calls, the group was able to point out many short-cuts which could be effected through proper planning in advance, not only of such calls, but in actual presentation of products to be sold.

The dealer's viewpoint and position in the merchandising plans of gas utility and gas appliance companies was ably presented by Bernard A. Seiple, who explained he was well qualified with 28 years' background on the utility side of the desk and nearly three years' experience as an appliance dealer. Outlining the essentials necessary for a successful dealer cooperation plan, Mr. Seiple declared that a dealer should be thoroughly educated, not only in requirements, servicing needs, prices, and qualities of the appliance he sells, but that he should understand the utility's rates and how they are applicable to gas appliances, and the advantages of gas over competitive fuels.

Opportunities for increasing base loads of utility companies through merchandising of newer appliances such as gas incinerators and gas laundry dryers were presented by R. J. Miller, The Ohio Fuel Gas Company. Mr. Miller discussed the sales methods used by his company in their successful merchandising of these and other gas appliances.

Melva Haskins and Dorothy Dean, The East Ohio Gas Co., ably demonstrated the effective home service program which that company gives in the Cleveland schools.

The New Freedom Gas Kitchen Program and its accompanying Certification Program were colorfully and interestingly presented by Chester S. Stackpole, chairman, A. G. A. Residential Gas Section, and newly-appointed vice-president, Chrysler Air-Temp Corporation.

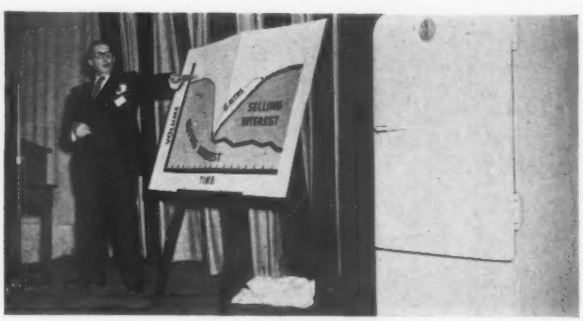
R. M. Lockwood, National Association of Home Builders of the U.S., gave the conference a clear picture of the present and future possibilities of the new home market. He predicted about one million new homes a year for the next ten years, barring a change in the present home financing procedures as exemplified in F. H. A. requirements. Private industry has proved its ability to supply these homes more efficiently and more economically than can be done under Government control or subsidies, he declared. The greatest boon to home building would be a reduction in Government expenditures with a consequent decrease in taxation.

Leadership at the sessions was on a par with the programs presented. Irving K. Peck, vice-president, Manufacturers Light & Heat Co., Pittsburgh, Pa., acted as conference chairman and presided at the first

Main points in the New Freedom Gas Kitchen Program and its accompanying Certification Program were dramatized (left) by Chester S. Stackpole (see above)

Assistant Professor J. H. Davis (right) and graduate members, Ohio State University, in a presentation, "Increasing Sales Efficiency"

W. D. Williams, Public Service Electric & Gas Co., and chairman, A. G. A. Water Heating Committee, in a talk on the automatic gas water heater



John T. Knighton, Servel, Inc., illustrating a conference talk in which he stressed the necessity of planned selling of gas and gas appliances

Home service representatives seen at N. E. G. A. annual meeting: (left to right) Flora Dowler, The Manufacturers Light & Heat Co.; Pauline Treisch, The Tappan Stove Co.; Millicent Bibza, The Manufacturers Light & Heat Co.; Lila Oyen, Peoples Natural Gas Co.; Dorothy Dean, The East Ohio Gas Co.; Jean Torrance and Helen Bell, Peoples Natural Gas Co., and Kathryn Barnes, Equitable Gas Company

morning session. George L. Scofield, Republic Light Heat & Power Co., Inc., Buffalo, N. Y., was chairman of the Wednesday afternoon session. Raymond Little, sales manager, Equitable Gas Co., Pittsburgh, Pa., lead the opening session on Thursday, with H. Leigh Whitelaw, managing director, Gas Appliance Manufacturers Association, as chairman at the afternoon session on Thursday. Thirty manufacturer members of G.A.M.A. served as hosts at the Friendship Room get-togethers following each of the afternoon meetings.

The following Equitable Gas Company employees assisted at the conference: Dena Demas, Margaret Leonard, Mary Neeson, Clara Bonomo, Johanna Mills, Dorothy Naumann.

INDUSTRIAL GAS HEATING

(Continued from page 8)

2. The extent and effect on physical properties of decarburization that may be produced with either the gas or induction heating methods.

3. Determination if the present minimum hardness depth of 0.125" produced by gas heating is an advantage or disadvantage.

It will require approximately one year for completion of these three projects and it is hoped to report at an early date that actual work has been started on them.

The committee recommends that additional research work be started as soon as possible on the following *functional research* projects:

1. The advantages that will accrue to the high speed gas heating process if oxygen or oxygen enriched air is used.

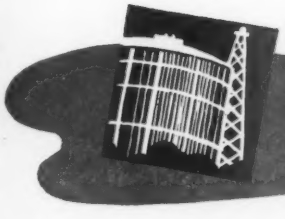
2. The improvements necessary in refractories and burner equipment to gain full advantage of the higher flame temperatures.

The A. G. A. Industrial and Commercial Gas Section, by means of News Letters will report the progress made on these various research projects that might be undertaken. Any data or information developed from these projects or from other sources which further proves the advantages of high speed gas heating or indicates further improvement in the process will be given fullest publicity in trade publications. A color-sound movie on high speed gas heating similar to the electrical industries film on electric welding might be produced for showing before technical groups. The money spent for such a film should quickly be repaid from revenue received from new gas loads added to our systems.

We suggest that every industrial gas engineer submit details and operating data to A. G. A. Headquarters covering each representative high speed gas heating installation located in his territory. Such information would be most helpful to others who may be planning similar installations.

If we in the gas industry will work together to further the development and promotion of this most important heating tool that we have at our disposal, we not only can recover the ground we have lost to induction heating, but can advance to an impregnable position of supremacy from which we cannot be displaced.

In the limelight: (left to right) Harold E. Jalass, general sales manager, Cribben & Sexton Company; Joseph C. Bevis, Opinion Research Corporation; R. M. Lockwood, National Association of Home Builders of the United States, and Bernard A. Seiple, president, Jersey Central Appliance Company



TECHNICAL SECTION

A. C. CHERRY, Chairman | S. J. MODZIKOWSKI, Vice-Chairman | A. GORDON KING, Secretary

Production and Chemical Plans

J. G. Sweeney

C. C. Russell

A HIGHLY informative Production and Chemical Conference is planned for the Berkeley-Carteret Hotel, Asbury Park, N. J., May 24-26.

C. C. Russell, Koppers Co., Inc., Kearny, N. J., chairman, the Technical Section's Gas Production Committee, and J. G. Sweeney, The Brooklyn Union Gas Co., chairman, Chemical Committee, have scheduled a program of general sessions and luncheon conferences on vital issues of wide interest to technical men in the gas industry.

Assisting actively in plans to make this an outstanding Production and Chemical meeting are Dr. F. E. Vandaveer, The East Ohio Gas Co., Cleveland, O., vice-chairman, Chemical Committee, and H. C. Jones, New England Power Service Co., Boston, Mass., vice-chairman, Gas Production Committee.

Tentative plans call for the conference to open with committee meetings on Monday, May 24, followed by an afternoon general session. Mr. Sweeney will preside and E. H. Werner, president, Jersey Central Power & Light Co., Asbury Park, will welcome the visitors. H. Carl Wolf, A. G. A. managing director, is also expected to deliver a talk on the afternoon program.

Another feature which may be included on Monday afternoon is a report on the industry's important gas production research program.

Mr. Russell will preside at a symposium on raw materials for gas fuel on Monday evening. Dr. H. J. Rose, director of research and vice-president, Bituminous Coal Research, Inc., Pittsburgh, Pa., will discuss the availability of coal for gas manufacture, and other speakers are expected to cover the subjects of coke, LP-gases, oil, and natural gas.

First feature of a Tuesday morning parallel session of the Gas Production Committee will be an address by W. A. Leech, Jr., sales engineer, Koppers Co., Pittsburgh, Pa., on modernization of coke ovens.

W. C. Wardner, superintendent, The Connecticut Coke Co., New Haven, Conn., in a talk on increasing gas production from coke oven plants, will discuss the results of a survey he has made.

Measurement of coking pressure in a small laboratory oven is expected to be presented by B. W. Naugle, J. D. Davis, J. T. McCartney, and J. E. Wilson, U. S. Bureau of Mines.

Frank P. Lamb, assistant superintendent of production, Washington Gas Light Co., Washington, D. C., has selected as his title "Technical Aspects of the Washington Changeover."

A parallel session of the Chemical Committee on Tuesday morning will open with a talk on revivification of iron oxide in situ by John B. Di Rienzo, assistant chief chemist, Harrison Gas Works, Public Service Electric & Gas Comany.

P. V. Mullins, helium engineer, Bureau of Mines, Amarillo Helium Plant, Amarillo, Texas, will expound prospective benefits from removing excess nitrogen from natural gas, or a related subject.

Other addresses are tentatively scheduled for the Tuesday morning Chemical session as follows:

E. O. Mattocks, Phillips Petroleum Co., Bartlesville, Okla., on methods for sampling and analysis of LP-gases; and chemical cleaning of boilers and chemical control of high pressure boilers or a related subject, by a speaker from Consolidated Edison Co. of New York, Inc.

Four luncheon conferences on Tuesday will cover, respectively, carbonization and coke, chemistry in the gas industry, high B.t.u. and LP-gases, and water gas operation.

A general session on Wednesday morning will include an address by Hudson W. Reed, president, The Philadelphia Gas Works Company and the American Gas Association.

Another feature of the morning session will be a speech by W. F. Brown, safety director, Consolidated Edison Co. of New York, Inc., and chairman, A. G. A. Accident Prevention Committee, on accident prevention principles.

W. R. Fraser, experimental engineer, Michigan Consolidated Gas Co., Detroit, Mich., and chairman, the Technical Section's recently formed Corrosion Committee, will deliver that committee's report.

Chemical aspects of underground corrosion and corrosion prevention will be presented by Dr. I. A. Denison, chief, underground corrosion section, Division of Metallurgy, National Bureau of Standards, Washington, D. C.

As final speaker on the morning program, J. F. Anthes, assistant to chief chemist, The Brooklyn Union Gas Co., will deliver a progress report on mixed gas research.

The afternoon session will include a review of work on reforming higher hydrocarbons by J. W. Carroll, Philadelphia Electric Co., and R. B. Paquette, The Peoples Gas Light & Coke Co., Chicago, Illinois.

An informative report on catalytic reforming of hydrocarbons will be delivered by C. H. Riesz, Institute of Gas Technology, Chicago, Ill., where extensive research is in progress on this subject for the A. G. A. Gas Production Research Committee.

Another timely contribution will be presented by S. W. Horsfield, gas production manager, Long Island Lighting Co., Mineola, N. Y., on operation of the company's Riverhead catalytic cracking plant.

Laboratories

ARTHUR F. BRIDGE, Chairman
EDWIN L. HALL, Director

Registration Notice Added To Laboratories Symbols

ALL manufacturers of approved gas appliances and listed accessories recently were advised to incorporate an encircled letter "R" in the trade-marked American Gas Association Laboratories Approval Seal and Listing Symbol. The encircled letter, displayed in connection with these symbols, constitutes notice of registration with the U. S. Patent Office, necessary to protect rights to them.

Manufacturers have been supplied with new reproduction proofs of the complete symbols incorporating the change. The encircled "R" is placed between the lower two points of the star on the Approval Seal and at a point within the lower portion of the letter "G" of the Listing Symbol.

Although both symbols have been trademarked for many years, the new procedure was made necessary by enactment of the Lanham Act, which, by federal statute, controls all trademarks, symbols, and other service or certification marks used to identify and distinguish manufactured articles. Application for registration under this act was made some time ago.

Display of both symbols bearing registration notice will be required on and after January 2, 1949. It is understood, however, that existing stocks of name plates on hand at the time of notice to manufacturers may be used up. Due to the smaller size in which the listing symbol is often employed and the method of its application to accessories, the encircled letter may be omitted in those cases where it is practically impossible to display it legibly.

A new edition of official marking requirements incorporating the changes in the symbols will be published in the near future.

New Testing Technique For Conversion Burner Pilots

IN application of revised requirements for conversion burners now in force, a new method of testing automatic pilots used in conjunction with such burners has been developed at the American Gas Association Testing Laboratories.

Incorporated in regular testing procedures, the new technique more nearly approximates operating conditions encountered in furnaces and boilers than does a conventional test oven as formerly employed.

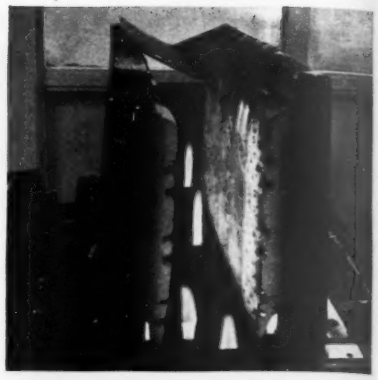
Under the new requirements, the test period for automatic pilots is increased from 720 to 1,440 hours. The new test assembly makes use of a combination of radiant and convected heat and also allows for the passage of air around the pilots as when installed in a furnace or boiler.

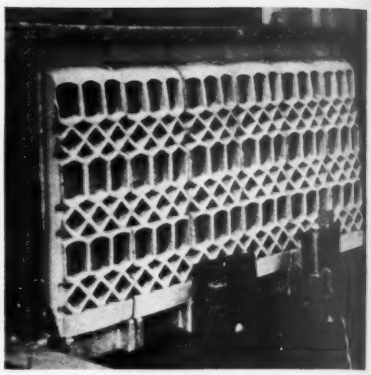
Under the new method, pilots are installed between two sets of clay radiants. Each set is composed of a series of radiants, the individual sections of which are separately connected to the gas supply. Sensitive control of temperature is thus afforded by adjustment of the gas rate to each section.

The test method is adaptable to both vertical and horizontal type pilots. Temperatures along the horizontal direction of the testing device are controlled by the gas rate. Vertical temperatures are controlled by means of shielding.

Temperatures reproduced are those actually encountered in a furnace or boiler installation. Pilots are first installed in test units of the proper size as an integral part of the conversion burner submitted for certification. Spot temperatures on various points of the pilot are recorded. The pilots are then placed in the device for the life test and the spot temperatures reproduced.

Two samples of each pilot are used. One is cycled 100 times during the first 720 hours, while the other burns constantly. During the next 720 hours the first pilot burns constantly while the second pilot is cycled. Both are required to satisfactorily withstand the test conditions imposed throughout the entire period. Certification under the approval plan is for the specific conversion burner with which the pilot is furnished.





Conversion burner pilots undergoing life test, and interior of assembly with one side removed

Housewives Flock to Birmingham "Fair"

Cooking school session during recent Housewares Fair at Pizitz department store, Birmingham, Alabama. Virginia Tullis, home service director, Birmingham Gas Co. (right), with home service advisor dressed as "Tiny Flame," and four-year-old child who demonstrated safety and ease of gas cooking

A. G. A. Steel Committee To Report on Industry's Needs

A GAS Utility Steel Requirements Committee has been organized by the American Gas Association to make a survey of steel needs of the gas industry in connection with a program of voluntary allocation now being considered by the steel industry under Public Law 395.

Alexander Macomber, director, Portland Gas Light Co., Boston, Mass., who served as director, Manufactured Gas Division, Office of War Utilities, during the war, has been appointed chairman of the committee by Hudson W. Reed, A. G. A. president. Other members are Eskil I. Bjork, vice-president, The Peoples Gas Light and Coke Co., Chicago; D. A. Hulcy, president, Lone Star Gas Co., Dallas; and H. N. Mallon, president, Dresser Industries, Inc., Cleveland.

Purpose of the A. G. A. steel committee is to assemble data on all steel requirements of the gas industry except natural gas transmission and gathering lines. A separate committee appointed by the National Petroleum Council will gather statistics on the requirements of the petroleum industry. As part of this study, a subcommittee headed by N. C. McGowen, president, United Gas Pipe Line Co., Shreveport, La., is collecting information on natural gas transmission and gathering lines.

The entire steel requirements of the gas industry as assembled by the two committees will be collated and coordinated by the Gas and oil division, Department of the Interior, and presented to the Steel Advisory Committee organized under the Department of Commerce.

Gas Industry Forms Committee on Economics

APPOINTMENT of a Committee on Economics, with R. E. Ginna, vice-president, Rochester Gas & Electric Corp., Rochester, N. Y., as chairman, has been announced by H. Carl Wolf, managing director, American Gas Association.

The new committee was formed as a result of the activities of the former A. G. A. Committee on Development and Use of Gas Industry Statistics, of which Mr. Ginna was chairman, and the A. G. A. Committee on Market and Economic Research, headed by E. H. Eacker, vice-president, Boston Consolidated Gas Co., and will coordinate the activities of A. G. A. committees, bureaus and personnel engaged in studies of an economic nature.

Included are proposed studies in such related fields as marketing research and statistics; periodic surveys of the gas industry's needs for research in economic matters, and advising officers, bureaus, and personnel of the Association regarding economic aspects of the gas industry.

Members of the Committee on Economics which held its first meeting in Washington, D. C., February 6, are Mr. Ginna, George Baird, executive vice-president, Southwestern Development Co., New York; Mr. Eacker; Frank L. Griffith, vice-president, The Peoples Gas Light & Coke Company, Chicago; F. B. Jones, manager, Sales & Market Research, Equitable Gas Co., Pittsburgh; H. L. Masser, executive vice-president, Southern California Gas Co., Los Angeles; J. F. Merriam, vice-president, Northern Natural Gas Co., Omaha; E. W. Morehouse, vice-president, General Public Utilities Corp., New York; B. G. Neilson, vice-president, The Brooklyn Union Gas Co., New York; F. W. Peters, secretary and treasurer, Oklahoma Natural Gas Co., Tulsa; Harry A. Weitzman, manager, rate and economic research department, Rochester Gas and Electric Corp., New York; and John A. Williams, chairman, A. G. A. Accounting Section, and assistant controller, Niagara Hudson Power Corp., Syracuse, N. Y.; Walter E. Caine, director, A. G. A. Bureau of Statistics, is committee secretary.

At the initial meeting it was decided that in view of the wide scope of economic fields to be covered, the main committee would restrict its activities to broad questions of policy. Specific problems would be analyzed and recommended upon by three principal subcommittees, with a chairman appointed from within the main committee but with members selected from outside the committee.

Harry A. Weitzman, Rochester, was appointed chairman of the Subcommittee on Statistics. F. B. Jones, Pittsburgh, was named chairman of the Subcommittee on Marketing and Sales Problems, and E. W. Morehouse, New York, was appointed chairman of the Subcommittee on Economic Problems.

Stockholders Set Record

STOCKHOLDERS of Consolidated Edison Co. of New York, Inc. in 1947 attained a total of 156,842, an increase over 1946 of 1,645 for an all-time high in the company's history.

Recordings Stress Home Economics Careers

Jim Campbell, well-known CBS announcer, and professional actresses, recording one of eight playlet dramas on "Careers in Home Service." The series is sponsored by the A. G. A. Home Service Committee, members of which were present at all times during cutting of the records

A NOVEL series of eight playlet records entitled "Careers in Home Economics" has been made available by the American Gas Association to gas companies as an important gas industry contribution to the strong recruitment program sponsored by the American Home Economics Association.

By loaning the recordings to local school systems, gas companies can effectively build up interest in the growing field for business home economists and at the same time help to meet the increasing need for trained home service personnel.

The A. G. A. Home Service Committee under its chairman, Elizabeth J. Lynahan, home service director, The Peoples Gas Light & Coke Co., Chicago, Ill., has set up the record series on a national scale following the outstanding success of The Ohio Fuel Gas Company's record "loan service" in 1946.

The Ohio company's recordings described different careers open to graduates from a college course in home economics. The records gained great popularity in the high schools and their fame soon spread to home economists throughout the country. They were even borrowed by several state home economics associations for use in state convention programs.

In order to make these records suitable for national distribution, the original scripts have been revised for recutting and the recordings made by Wilding Pictures, Inc., a nationally-known recording organization.

Professional actresses play the leading roles, and Jim Campbell, a prominent CBS announcer, is narrator. Members of the A. G. A. Home Service Committee were present at all times during the cutting of the records.

The eight capsule dramas in the new series are designed specifically to inform high school and college girls about the many opportunities in the home economics field. The complete set of eight records is available at cost—$55.

A. G. A. Convention Plans

ALL arrangements for the thirtieth annual convention of the American Gas Association and exhibition of the Gas Appliance Manufacturers Association to be held in Atlantic City, N. J., October 4-8, 1948, are proceeding according to plan.

As of March 1, approximately 1,500 Association members had secured hotel reservations for the convention. Additional copies of the application blank for hotel reservations may be obtained from the American Gas Association in New York and should be filed promptly with the A. G. A. Housing Bureau, 16 Central Pier, Atlantic City, N. J. Members are urged to give all information requested on the application in order to expedite handling.

In designating choice of hotels, attention should be directed to the fact that meetings and headquarters of the Accounting Section will be at the Chalfonte-Haddon Hotel; Industrial and Commercial and Residential Gas Sections at the Ritz-Carlton Hotel, and the Technical Section at the Ambassador Hotel.

At a recent meeting, the Convention Committee headed by A. G. A. Past-President T. J. Strickler, Kansas City, agreed on a general plan to include a meeting of the Natural Gas Department on Monday morning, October 4; a meeting of the Manufactured Gas Department that afternoon; and general sessions on the mornings of October 5, 6 and 7, with Sectional meetings those afternoons.

The Convention Entertainment Committee under the chairmanship of Louis R. Quad, Public Service Electric & Gas Co., Elizabeth, N. J., has carefully reviewed entertainment requirements for the week with the view of selecting those types which will be most popular with delegates and guests. Committee members have been designated to work with Headquarters staff on the details.

On the basis of early space reservations, the exhibition of gas appliances and equipment conducted by G.A.M.A. will be the largest ever held as regards the number of exhibitors, space used, and products displayed.

In an eight-day period following issuance of the show's prospectus, 100 manufacturers received 53,000 square feet of the Atlantic City Auditorium for the 1948 exhibition. These early figures compare very favorably with final figures of 137 manufacturers who booked 60,000 square feet for their exhibits at the 1946 show.

G.A.M.A. reports that not only are manufacturers showing a high tempo of interest in the exhibition by arranging for their space requirements far ahead of the October event, but that they are requesting larger space this year to display their new or improved products.

Accident Prevention Planners Meet

A. G. A. Accident Prevention Committee members and guests at recent meeting in New York: Standing: (l. to r.) B. I. Johnson, Springfield; W. J. Alexander, Newark; G. J. Ruoff, Poughkeepsie; E. C. Baumann, Newark; W. H. Adams, Pittsburgh; A. Gordon King, A. G. A.; L. E. Dequine, Long Branch, N. J.; L. Edsall, Philadelphia; A. H. Doud, Rochester; W. T. Rogers, New York; D. C. Stewart, Buffalo; G. R. King, Philadelphia; H. P. Allen, Boston. Seated: P. L. G. Hasskarl, Allentown; W. F. Brown, New York; H. T. Jayne, Philadelphia (chairman), and Dr. W. J. Huff, College Park, Maryland

Toronto Company Marks Hundredth Anniversary

THE Consumers' Gas Co. of Toronto, Toronto, Canada, is celebrating its centenary with a number of enviable records behind it.

Already this year the company has exceeded its previous all-time record in daily gas production on ten occasions. There has never been a general interruption of gas supply in the company's century of service.

A maximum day's output is now more than 32 million cubic feet—about six times the annual production in 1848. Customers have increased to 178,000. Behind the organization is an investment of $30 million, a group of almost 5,000 shareholders, and 1,300 employees.

Large Safety Convention Planned for New York

PROBLEMS of management, labor relations, and new safety technique in those fields will be discussed at five sessions of New York's eighteenth annual Safety Convention and Exposition at the Hotel Pennsylvania for four days beginning April 13, under the sponsorship of the Greater New York Safety Council.

William F. Brown, safety director, Consolidated Edison Co. of New York, Inc., and chairman, American Gas Association's Accident Prevention Committee, will preside at a Tuesday morning session on personal protective equipment and also at a Thursday luncheon of the American Society of Safety Engineers, Metropolitan Chapter. Mr. Brown is a member of the convention's executive and finance committees.

A public utilities session Tuesday afternoon will be directed by W. E. Himsworth, industrial relations director, The Brooklyn Union Gas Co., and will cover meeting increased service demands with safety, a complete eye protection program, and safety salesmanship for foremen. On Thursday afternoon a public utilities safety clinic will be held with gas production and distribution one of the topics.

The Texas City disaster and use of LP-gas safety in industry are among the numerous other subjects scheduled on the program. A special session on atomic energy will be presented on Wednesday, April 14.

Providence Reports On Gas Has Got It

A NOVEL piece of tie-in publicity for the current Gas Has Got It campaign is provided by the 1947 annual report of Providence Gas Co., Providence, R. I., recently released.

Company stockholders are informed that "The American Gas Association and the gas range manufacturers in October embarked upon a four-million-dollar national magazine advertising campaign to tell housekeepers and husbands about today's automatic 'CP' (Certified Performance) gas ranges. The Company

subscribed to this national advertising campaign. Such advertisements when read locally become local advertising, and for excellence in color, layout and general appeal are beyond the budget of any single utility."

Another reference in the Providence report adds a new perspective to the variety of activities undertaken by home service.

"The Girl in White, an advertised personality, has come to be known as representative of the Home Service Department by the women of the Company's territory. The day before Thanksgiving, once every four minutes, on the average, the Girl in White received a telephone call requesting instructions or advice of some sort with reference to the preparation of the Thanksgiving dinner. On the same day, many other similar requests were received from callers at the booth on the first floor of the central office building. The year's activities for the Girl in White included a series of cooking classes for prospective brides; classes for nurses in planning, buying and cooking for better nutrition, given at the joint request of the Providence District Nursing Association and the Providence Health Nurses; participation in the recruitment program of the Rhode Island Home Economics Association; a breakfast demonstration for Camp Fire Girls; a considerable number of non-commercial talks before various student bodies; and various food and kitchen planning talks before club groups."

New Department Created By Southern California

CREATION of a central transmission department with Grove Lawrence, former manager of butadiene production, as manager, has been announced by William Moeller, Jr., vice-president, Southern California Gas Co., Los Angeles, California.

Functions of the compression and storage department, central division, will be taken over by the new department and the former department will be discontinued. Mr. Moeller pointed out that now that the Texas-California pipeline is completed it is hoped that the new department will provide more intensive supervision of facilities within the central division, lightening the burden of the distribution department whose operations are also increasing.

Fenton Kelsey Becomes Gas Magazines, Inc.

THE Fenton Kelsey Co., Chicago, Ill., has changed its name to Gas Magazines, Inc., in order to identify the company more completely with the gas industry.

Cooking for Profit, a gas sales aid for 17 years, and *Building And Selling Homes*, as well as other publications and special promotional material for the industry will be continued as before.

Following the retirement of Fenton Kelsey last July after a long career with the gas industry, Edward J. Mayland has been appointed president and general manager, Gas Magazines, Inc. Mr. Mayland has held important positions in the company for the past six years.

Natural Gas Subjects Announced

R. W. Hendee

E. M. Borger

Price Daniel

W. A. Dougherty

NUMEROUS well-known speakers on timely subjects have been scheduled for the spring meeting of the Natural Gas Department, American Gas Association, in Houston, Texas, May 4-5.

The program committee under the chairmanship of A. H. Weyland, Shreveport, La., has scheduled general sessions speakers on the Tidelands Case, progress in conservation, fuels of the future, the Natural Gas Act, research in gas flows in pipelines, centrifugal compressors, and mobile radio.

Afternoon sessions will be devoted to discussions sponsored by the Transmission, Accounting, and Production and Storage Committees. Robert W. Hendee, chairman, A. G. A. Natural Gas Department, and president, Colorado Interstate Gas Co., Colorado Springs, Colo., will preside at the general sessions.

Hudson W. Reed, president, A. G. A. and The Philadelphia Gas Works Co., is tentatively scheduled to speak on "Our Association" at the opening general session. Hon. Price Daniel, attorney general of Texas, will discuss the Tidelands Case on which he has done a great deal of work since taking his present office.

An interesting phase of Natural Gas Act amendments will be discussed by William A. Dougherty, New York.

J. William Ferguson, natural gas engineer, U. S. Bureau of Mines, Amarillo, Texas, is listed on the advance program as another principal speaker on the subject "Gas Flows in Pipe Lines—Research Project."

B. D. Goodrich, chief engineer, Texas Eastern Transmission Corp., Shreveport, La., is expected to speak on "The Application of Centrifugal Compressors to High Pressure Gas Transmission."

E. S. Pettyjohn, director, Institute of Gas Technology, Chicago, Ill., has selected "Attacking the Peak Load Problem" as his subject.

In another major address of particular importance at this time, Edward M. Borger, chairman, A. G. A. Mobile Radio Committee, and president, The Peoples Natural Gas Co., Pittsburgh, Pa., will discuss "Mobile Radio as an Aid to Dependable Gas Service."

The arrangements committee under the chairmanship of Frank C. Smith, president, Houston Natural Gas Corp., is planning an information service to be located in the lobby of the Rice Hotel during the natural gas meeting. A style show for ladies and an inspection trip to one of the country's largest production fields are also on the agenda.

Requests for hotel reservations should be addressed to Mrs. Earl W. Purser, secretary, Houston Hotel Men's Association, Commerce Building, Houston 1, Texas.

Notes from F. P. C.

● **The Philadelphia Gas Works Co.**, Philadelphia, Pa., will receive an emergency allocation of 4,300,000 cubic feet of natural gas daily from Texas Eastern Transmission Corporation beginning March 25 and continuing through April 30, 1948, provided that such deliveries may be reduced or discontinued on short notice to meet any emergency in the areas now served by Texas Eastern.

● **A map showing as of 1947** the principal natural gas pipelines in the United States and information making it possible to trace the flow of natural gas from its source to the point of consumption has been published by the Federal Power Commission.

Listed as F.P.C.-M-7, the map is printed in 12 colors suitable for framing and priced at $5 a copy. Pipelines authorized but not yet constructed are also shown.

● **El Paso Natural Gas Co.**, El Paso, Texas, has applied for permission to construct and operate a project to make an additional 300 million cubic feet of natural gas a day available to companies distributing and selling natural gas in San Francisco, Oakland, Berkeley and other communities in California.

Construction would cost $81,101,200 and would be completed in time to commence deliveries of gas through the system by November 15, 1950 or not later than January 1, 1951.

● **Texas Gas Transmission Corporation** has been authorized to acquire by merger and to operate the facilities of Memphis Natural Gas Company and Kentucky Natural Gas Corporation for the transportation and sale of natural gas in interstate commerce.

Midwest Personnel Executives Meet

ABOUT 40 personnel executives of gas companies met at the Hotel Fontenelle in Omaha, Nebr., February 25 under the auspices of the American Gas Association Midwest Personnel Conference, Vernon Myers, Sioux City Gas and Light Co., chairman. As usual with the meetings of this group most of the day was devoted to discussion of actual problems faced by the companies represented.

Following opening remarks by Chairman Myers, Kurwin R. Boyes, secretary, reported on the personnel activities of other A. G. A. committees and reviewed recent significant publications in this field.

In the interests of coordination, a discussion on safety efforts was lead by J. D. Killoren, safety director, The Laclede Gas Light Company, St. Louis, Mo., and a member of the A. G. A. Accident Prevention Committee. This discussion disclosed a general concern at the upward trend of accidents and a need for greater preventive measures. Several executives reported on special studies made by their companies bringing out phases which will be helpful to those present. The remainder of the conference was devoted to the reporting and discussion of wage negotiations, wage rates, outside employment, and other pertinent topics.

The secretary of the conference, Roy L. Thomas, Colorado Interstate Gas Co., was authorized to address letters to the past chairmen, R. B. Harkins, H. F. Voertman, and C. C. Jolley, now on other work, expressing the appreciation of the group for their outstanding contributions.

The next meeting of the A. G. A. Midwest Personnel Conference will be held in Kansas City, Wednesday, June 9. All gas companies in the midwest area are invited to send their personnel executives. A notice will be sent to them by application to the secretary of the conference, Roy L. Thomas, P. O. Box 1087, Colorado Springs, Colorado.

Texas Eastern Files Pipeline Proposal

TEXAS Eastern Transmission Corp., Shreveport, La., announced in March that it had applied to the Federal Power Commission for permission to build and operate a 26-inch pipeline parallel to its Big Inch line for the purpose of bringing natural gas from the Southwest to gas distributing companies on the Eastern Seaboard and in the Appalachian area.

This was the second application in recent months for a natural gas artery from Texas fields to the East. Previously Trans-Continental Gas Pipe Line Co., Inc., Longview, Texas, had filed an amended application to build a 1,839-mile 26-inch transmission system beginning near Mercedes, Texas, and extending to a New York City delivery terminus.

R. H. Hargrove, president, Texas Eastern, explained that his company's project would run 1,020 miles over the Big Inch line right-of-way to a point about 20 miles east of Wind Ridge, Pennsylvania. At that spot it would tie in with existing Big and Little Inch lines to carry natural gas to Philadelphia and Linden, N. J., where extensions could be routed to New York.

Texas Eastern also proposed to construct about 400 miles of 26-inch pipe from Longview, Texas, to gather natural gas at sources of supply, and a total of 30 gas compressor stations.

The proposed line, two inches larger than the present Big Inch, would be designed to deliver 425 million cubic feet of gas a day. Of this amount, 39 million cubic feet a day would be sold in the Appalachian area and 386 million cubic feet a day would be delivered for use on the Eastern Seaboard.

Texas Eastern estimated that the pipeline would deliver about 147,369,000,000 cubic feet of gas a year. These new facilities together with proposed construction on the Inch lines would increase the company's delivery capacity over its entire pipeline system to 933 million cubic feet a day.

Mr. Hargrove estimated the project's cost at $152,131,000. Construction calls for 4[illegible] 000 tons of steel and would probably [illegible] several years due to present steel shorta[illegible] he added.

Earlier Mayor O'Dwyer of New York [illegible] stated that use of Texas natural gas w[illegible] save The Brooklyn Union Gas Company [illegible] Consolidated Edison Co. of New York, [illegible] which supply much of the city, more than [illegible] million in gas making costs.

McDonald Elected to A. G. A. Finance Committee

LYLE McDONALD, vice-president [illegible] comptroller, Public Service Electric [illegible] Gas Co., Newark, N. J., has been elected [illegible] member of the Finance Committee, Americ[illegible] Gas Association. One of the most importa[illegible] A. G. A. committees, this group reviews [illegible] financial requirements of the Association [illegible] makes budgetary recommendations to [illegible] Executive Board.

A. G. A. Active at Home Builders' Show

KEEN interest by both visitors and gas industry men was shown in the American Gas Association's New Freedom Gas Kitchen Exhibit at the annual convention and exposition of the American Home Builders National Association held at the Stevens and Congress Hotels, Chicago, Ill., February 22-26.

A certified New Freedom Gas Kitchen occupied 13 feet of the A. G. A. booth and the remaining space was devoted to individual gas appliances with a three-foot-square certificate as a background.

Five miniature New Freedom Gas Kitchens added color to the display. In addition 20,000 pieces of New Freedom Gas Kitchen Bureau literature were given away to visiting architects, builders, contractors, and dealers.

F. X. Mettenet, vice-president, The Peoples Gas Light & Coke Co., Chicago, provided excellent assistance for the gas industry display by offering the help of the following personnel: Eric Enberg, Mary [illegible] Robison and Doris Plagge, home plan[illegible] department; Mrs. Patricia Eastes, a fo[illegible] employee; J. F. Fitzgerald, Charles Kir[illegible] patrick, Robert Ingeman, new construction department.

Other assistants who helped to staff th[illegible] booth were: John Furey, John Wilkinson a[illegible] Henry Showalter, Cribben & Sexton Co., Ch[illegible] cago; C. F. Perry, Jr., Reznor Manufactu[illegible] ing Co., Mercer, Pa.; Edward Richter, Ha[illegible] rison Cabinet Co., Chicago; J. C. Mulhern [illegible] The Hotstream Heater Co., Cleveland, O.[illegible] and Gloria Gaupp, A. G. A.

The Home Builders Association issued [illegible] chart showing that while the average Amer[illegible] can increased his spending on food, clothing[illegible] jewelry, household equipment, and recreation[illegible] by more than 70 percent during the past [illegible] years, his expenditures on housing rose onl[illegible] ten percent during the same period.

Norval D. Jennings, secretary, A. G. A. New Freedom Gas Kitchen Program, and Gloria Gaupp, A. G. A., in the Association's exhibit at the National Association of Home Builders Convention

Associated Organization Activities

G.A.M.A. Meeting To Cover Vital Issues

J. A. Robertshaw

MAJOR problems affecting producer and public alike are on the agenda of the annual three-day meeting of the Gas Appliance Manufacturers Association, April 5-7 in the Hotel Drake, Chicago, Ill., according to an announcement by John A. Robertshaw, association president, who will deliver the keynote address at the opening general session.

Current matters to be discussed will include production problems, 1948 advertising and sales promotion programs, the challenge of competition, new markets, distribution plans and techniques, population changes, and relations with distributors, dealers, suppliers and government. General sessions, divisional and group meetings are planned, H. Leigh Whitelaw, G.A.M.A. managing director, reports.

Because of the approaching buyer's market, special attention will be given such subjects as the steel situation, rising installation costs, and labor relations. New and improved products, their presentation to the public and at the Atlantic City Exhibition in October, will also be the subject of reports.

Nationally known speakers will include Hudson W. Reed, president, The Philadelphia Gas Works Company and the American Gas Association, on "Merchandising as an Operator Sees It." Dr. Kenneth Walker, Hiwaii, author, lecturer and educator, will speak at the Tuesday luncheon on "Live Together—Or Live Not."

Wednesday morning general sessions speakers will be as follows: L. A. Brand, vice-president, Empire Stove Co., Belleville, Ill., on "LP-Gas—Restrictive Codes and Regulations"; E. S. Pettyjohn, director, Institute of Gas Technology, Chicago, Ill., reporting on "The Potential Effect of Gas Research," and Edwin R. George, economist for Dunn & Bradstreet, Inc., New York, on "The Business Outlook."

The annual meeting of the board of directors at which officers and directors are elected is scheduled for Monday afternoon, April 5. The various G.A.M.A. divisions will hold afternoon meetings Tuesday and Wednesday at which time their officers will also be elected.

Lyle C. Harvey, chairman, Exhibition Committee, and Harold Massey, G.A.M.A. assistant managing director, who is managing the Atlantic City show to be held concurrently with the American Gas Association annual convention the week of October 4, will report on plans and progress made in staging the project.

Among the other program features will be a report on the extent of cooperation of manufacturers in the gas range phase of the current Gas Has Got It campaign of A. G. A., by E. Carl Sorby, chairman, and James I. Gorton, sales promotion director, "CP" Range Manufacturers Group. Plans for the elaborate forthcoming advertising and sales promotion campaign for automatic gas water heaters will also be explained during the meetings.

New England Gas Association Business Conference Shows Dynamic Developments

New England Gas Association officers: (front row, left to right) Edward G. Twohey, Worcester County Electric Co., incoming president; James A. Cook, Lynn Gas & Electric Co., retiring president; A. V. S. Lindsley, The Connecticut Light & Power Co., first vice-president; (rear row) Clark Belden, executive secretary; Otto Price, Boston Consolidated Gas Co., treasurer; John A. Hiller, Portland Gas Co., second vice-president, and C. Clyde McGraw, Stone & Webster Service Corp., chairman, Program Committee

EDWARD G. TWOHEY, vice-president, Worcester County Electric Co., Webster, Mass., was elected president, The New England Gas Association at the group's twenty-first annual business conference in Boston, Mass., March 18-19.

A. V. S. Lindsley, vice-president, The Connecticut Light & Power Co., Waterbury, was elected first vice-president; John A. Hiller, sales manager, Portland Gas Light Co., Portland, Me., was made second vice-president; Otto Price, vice-president, Boston Consolidated Gas Co., reelected treasurer, and Clark Belden, executive secretary, reelected clerk.

James A. Cook, vice-president and general manager, Lynn Gas & Electric Co., Lynn, Mass., in the address as retiring president of the association discussed pending problems and dynamic developments facing the New England gas industry along what he termed "broad service" lines.

"When and if natural gas comes to New England," he declared, "some companies may elect to have their plants already manufacturing and delivering to the customers an oil gas interchangeable with natural gas."

Mr. Cook advised members interested in labor relations problems to study closely a system of employee education and craft training with promotion based on fitness and ability, which has been set up at Worcester Gas Light Co., Worcester, Mass., by R. J. Rutherford, vice-president of the company.

Following election of officers and directors, Clark Belden, N.E.G.A. secretary, presented highlights of the association's year, emphasizing the numerous ways in which it is serving public interest.

Hudson W. Reed, president, The Philadelphia Gas Works Co., Philadelphia, and the American Gas Association, in a talk entitled "The Gas Industry," stated that what makes A. G. A. "tick" is mainly "the personalities of the men operating it. Their understanding of the other fellow's troubles. Their willingness to compromise on differences of opinion, and on differences in sectional and operating requirements. . . ."

Another inspiring address was presented by H. H. Cuthrell, vice-president, The Brooklyn Union Gas Co., speaking on "Tomorrow's Sales Opportunities" as chairman, A. G. A. General Promotional Planning Committee. This talk and that of Lyon F. Terry, vice-president, The Chase National Bank, New

(Continued on page 46)

Personal and Otherwise

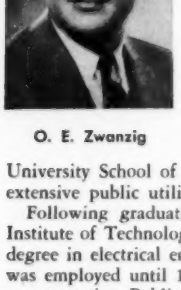
Fields Named Manager of Cincinnati Company

E. S. Fields

ERNEST S. FIELDS has been appointed general manager, Cincinnati Gas & Electric Co., Cincinnati, O., according to an announcement by Walter C. Beckjord, the company's president. Mr. Fields will continue to serve as vice-president in charge of the electric department and a member of the board of directors.

He joined the Cincinnati utility in 1914 and has spent his entire business career with the company and its subsidiaries. He was appointed manager of the electric department in 1929, was elected a vice-president in 1943, and a director two years later.

Zwanzig Takes A. G. A. Statistical Post



O. E. Zwanzig

APPOINTMENT of Otto E. Zwanzig, Nutley, N. J., as senior statistician of the American Gas Association, effective March 1, 1948, has been announced by H. Carl Wolf, A. G. A. managing director. Mr. Zwanzig is an instructor in the Department of Public Utilities and Real Estate, New York University School of Commerce, and has had extensive public utility experience.

Following graduation from Massachusetts Institute of Technology in 1936 with an M.S. degree in electrical engineering, Mr. Zwanzig was employed until 1942 as industrial power representative, Public Service Electric and Gas Co., Newark, N. J. During this period his work included an industrial power market analysis.

For several years, he was engaged in non-utility engineering work, including naval construction and industrial plant conversions for war production. Two years ago, he became associated with Dr. H. B. Dorau on several public utility consulting projects. These included a study of the magnitude and economic implications of utility taxation and rate analyses for utility presentations before regulatory commissions. He also assisted in the preparation of exhibits presented during the Federal Power Commission's natural gas industry investigation in 1946.

Brown Receives Bureau Of Mines Appointment

APPOINTMENT of Dr. Ralph L. Brown, widely known coal technologist and pioneer in the development of new products from coal tar chemicals, as chief of the U. S. Bureau of Mines Coal Branch, Fuels and Explosives Division, has been announced by James Boyd, Bureau director.

Following World War I, Dr. Brown directed a cooperative investigation by the Bureau and the American Gas Association on the resinous deposits troubling manufactured gas plants in many major cities, and discovered ways to prevent their formation. For this outstanding achievement, he received the Association's Beal Award in 1924.

Stackpole Moves to Chrysler Airtemp

C. S. STACKPOLE, chairman, Residential Gas Section, American Gas Association, has been named vice-president and general sales manager, Airtemp Division Chrysler Corporation.

Mr. Stackpole was formerly manager, merchandising and domestic sales, Consolidated Gas Electric Light and Power Co., Baltimore, Md., and had been associated with the Baltimore company for 20 years.

Born in Lynn, Mass., he graduated from Brown University in 1922 and soon after entered the employ of Stone and Webster through Blackstone Valley Gas & Electric Co., Pawtucket, R. I. He also worked at Fall River Gas Works Co., Fall River, Mass., and for Virginia Power & Electric Co., in Suffolk, Norfolk, and Richmond, Virginia.

Long identified with A. G. A. activities, Mr. Stackpole was a member of the Gas Water Heating Committee; Past-chairman, New Freedom Gas Kitchen Committee, and a member, National Advertising Committee.

In his capacity as chairman, A. G. A. Residential Gas Section, he directed a wide range of activities relating to the sale of gas and gas appliances and to the development of the utilization of gas, except for industrial and commercial purposes. Sectional work ranged from the training of gas utility personnel to the preparation of manuals for architects and builders. He forwarded the efforts of numerous committees which formulated requirements and policies for the development and promotion of every gas appliance that is used in the home.

Fletcher Elected Head of Providence Gas

R. L. Fletcher

L. E. Knowlton

RALPH L. FLETCHER, vice-president Providence Gas Co., Providence, R. I. since 1941, has been elected president of the company succeeding Frederick C. Freeman president since 1930. Mr. Freeman was elected chairman of the board.

Succeeding Mr. Fletcher as vice-president is Lauriston E. Knowlton, who has served as engineer with the firm since 1941.

Both Mr. Fletcher and Mr. Knowlton have played important parts in gas industry activities and both are currently members of the A. G. A. Advisory Council, Mr. Fletcher has served as an A. G. A. Director; chairman A. G. A. Committee on Domestic Gas Research; and as president, New England Gas Association and Guild of Gas Managers.

At the 1939 A. G. A. convention in New York Mr. Fletcher was awarded the Association's Meritorious Service Medal for his leadership in avoiding disaster during the 1938 hurricane.

Mr. Knowlton became chairman, A. G. A. Technical Section, in 1944, and has served as chairman, A. G. A. Gas Production Committee, and a member of the Managing and other important committees. He has also served as an officer and a director of the New England Gas Association.

He joined Providence Gas in 1919, and since that time has held the positions of assistant engineer of manufacture, engineer of manufacture, general superintendent, and engineer.

Engineers Promoted at Los Angeles Laboratories

PROMOTION of James A. Stone and Pieter Root, Jr., to chief inspection engineer and assistant chief testing engineer, respectively, Pacific Coast Branch, American Gas Association Testing Laboratories, has been announced by W. H. Vogan, supervisor at Los Angeles.

Mr. Root is a graduate of M.T.S. School, Amsterdam, Holland, in mechanical engineering. After securing his degree in 1935 he was employed as an engineer with a steamship company in Holland until he entered the Royal Netherlands Navy in 1939 as a lieutenant. He served in the Battle of the Java Sea, in the Atlantic and supervised ship construction for the Royal Navy at Beaumont, Texas.

He married an American citizen in 1944

and at the end of his naval service in 1946 officially entered the United States through Canada. He joined the Laboratories staff in January 1947 as a test engineer.

Mr. Stone went to California from his birthplace in Michigan in 1928 and attended Whittier College where he majored in chemistry. He enlisted in the U. S. Navy in 1942, served as chief petty officer on Guam and also as an instructor at the University of Colorado for 18 months. He joined the Laboratories staff as a test engineer early in 1946 and was promoted to inspector in November same year.

The promotion of Mr. Stone to chief inspection engineer followed the resignation of C. E. Koch to become chief engineer, Williams Radiator Co., Glendale, California.

Campbell and Knowlton Advance in Connecticut

C. L. Campbell

R. H. Knowlton

C. L. CAMPBELL has been elected chairman of the board, and Robert H. Knowlton, president, The Connecticut Light & Power Company.

Mr. Campbell has served as president since 1937 and has been with the company for more than 36 years. During that time he acquired a national reputation for accomplishment in the utility industry.

Mr. Knowlton, a past-president of the New England Gas Association, has been executive vice-president of the company since 1939. He became associated with the utility in a consulting capacity in 1917 and has served as a member of the board of directors since 1935.

Cooper Appointed Glenwood Manager

ELECTION of W. L. Cooper, Kankakee, Ill., as vice-president and general manager, Glenwood Range Co., Taunton, Mass., has been announced by Malcolm Leach, president. Also elected a member of the board of directors, Mr. Cooper will be in charge of all phases of the company's operations.

He was formerly vice-president and general manager, Florence Stove Co., and has a background of nearly 40 years in the stove business in both sales and manufacturing divisions.

Commenting on the appointment, Mr. Leach said that Mr. Cooper will direct the firm's plans for increased production at lower costs.

Wertz Receives New Position at Amarillo

R. E. WERTZ, nationally known figure in the natural gas industry, has been elected chairman of the board, Amarillo Oil Co., Amarillo, Texas, a newly-created position.

Formerly president of the oil firm and two affiliated natural gas concerns in the area, Mr. Wertz has been active in the American Gas Association for many years. He is a past-chairman, A. G. A. Natural Gas Department, a member of the Department's Nominating Committee, Advisory Committee, and other important groups.

Succeeding Mr. Wertz as head of the three companies are: president, Amarillo Gas Company—H. R. Budke, formerly vice-president and general manager; president, West Texas Gas Co., Lubbock, Texas—R. F. Hinchey, formerly vice-president and general manager; president Amarillo Oil Company—W. W. Rusk, formerly vice-president and assistant general manager.

M. D. Snyder, New York, has been named secretary, Amarillo Gas Co., Amarillo Oil Co., Clayton (New Mexico) Gas Co., Dalhart Gas Co., Panhandle Pipe Line Co., Red River Gas Co., and West Texas Gas Company.

George Baird, New York, and W. M. Wright, Amarillo, have been made vice-presidents, Amarillo Oil Company. T. S. Whitis, Amarillo, was made vice-president, Red River Gas Company.

R. E. Wertz

H. R. Budke

West Texas Gas Company serves natural gas in 44 cities and towns throughout the South Plains area of west Texas. Amarillo Gas Company serves Amarillo and its environs. Amarillo Oil Company and Panhandle Pipe Line Company transport natural gas from Panhandle Gas Field to Amarillo city gates. Red River Gas Company is a natural gas producing company.

Detroit Edison Elects Three Vice-Presidents

THREE vice-presidents were elected recently by the board of directors, The Detroit Edison Co., Detroit, Michigan.

Walker L. Cisler became executive vice-president as the principal administrative assistant to the general manager, President James W. Parker. He is also responsible for all personnel matters.

Edward T. Gushée as vice-president retains his present assignments from the chairman of the board, Prentiss M. Brown, but relinquishes the title, assistant to the chairman. Mr. Gushée will continue to report to the general manager on operating matters such as the gas division, and continues in charge of the legal division.

James H. Lobban as vice-president is responsible for the company's accounting records, financial and registration statements, and continues as secretary of the company.

Boshell Heads Standard Gas & Electric Company

EDWARD O. BOSHELL, vice-president, Stone & Webster Service Corporation since 1937, has been named president and chairman, Standard Gas & Electric Company, and the board of directors has been increased from eight to nine members.

Mr. Boshell succeeds Leo T. Crowley who resigned recently. J. Patrick Lannan joins Mr. Boshell as a new director.

Florida Man Wins Gas Magazines Contest

HENRY BIRCHALL, commercial representative, Peoples Water & Gas Co., Miami Beach, Fla., has received the $100 first prize in *Cooking for Profit's* contest "How I Used Cooking for Profit in 1947, and What It Has Done for Me."

Judges John J. Bourke, American Gas Association, and John T. Heilig, Savory Equipment, Inc., awarded the $50 second prize to Richard E. Barry, Wisconsin Power & Light Co., and the $25 third prize to Edward A. Lawler, Public Service Electric & Gas Co., Newark, New Jersey.

Sponsored by the publishers, Gas Magazines, Inc. (formerly Fenton Kelsey Co.), the contest drew entries from 36 gas companies.

H. P. Thomas, Peoples Water and Gas Co., congratulating contest winner Henry Birchall (right)

Frances Gibbons Promoted To A .G. A. Information Post

Frances Gibbons

PROMOTION of Frances Gibbons to secretary of information, American Gas Association with the status of senior staff member, has been announced by H. Carl Wolf, A. G. A. managing director.

Born in Roanoke, Va., Miss Gibbons joined A. G. A. in January 1936 as secretary to Major Alexander Forward, then managing director of the Association. In October 1945 she became secretary to H. Carl Wolf, present managing director, and continued in that capacity until her present appointment.

The position of secretary of information was created as a new service to the Association's membership. Miss Gibbons is well qualified to assist gas industry executives during their visits to A. G. A. headquarters.

Woolman Joins Bryant Heater

HARRY M. WOOLMAN, Jr., who has been with the Jersey Central Power & Light Co., Asbury Park, N. J., for 23 years has resigned from that company to become sales representative for Bryant Heater Co., Cleveland, Ohio.

H. M. Woolman, Jr.

Mr. Woolman has been in charge of house heating and industrial and commercial sales of Jersey Central and for many years has been active in the Industrial and Commercial Gas and the Residential Gas Sections, American Gas Association, in committee work for New Jersey Gas Association, and in the Metropolitan Gas Heating and Air Conditioning Council.

In his new post he will be field representative in the northern New Jersey branch of Bryant Heater covering the central New Jersey territory.

Columbia Gas System Changes Announced

JOHN C. FISHER has been named district sales supervisor for both the Cumberland and Allegheny Gas Co., and the Gettysburg (Pa.) Gas Corp., replacing W. G. Pomeroy who has taken over a similar position at Binghamton, (N. Y.) Gas Works, an affiliated company in the Pittsburgh group of the Columbia Gas System.

Mr. Fisher joined Cumberland and Allegheny Gas Co., as a gas appliance salesman in 1936, and in 1940 was advanced to heating engineer. He was named local sales supervisor at Cumberland in July 1946.

Mr. Pomeroy who will also serve as sales supervisor, The Keystone Gas Co., moved to Binghamton from Cumberland where his sales organization made an impressive record distributing modern gas appliances. He has been in the Pittsburgh group of gas companies for the past 12 years.

PROVED NATURAL GAS RESERVES INCREASE

(Continued from page 28)

and representative opinion. Each member in his district appointed a number of subcommittees to gather and study the necessary data. All previously determined factors pertaining to the various pools were examined and adjusted in the light of new information. The subcommitees, which were largely responsible for the data, were comprised of geologists and petroleum engineers with long experience in this class of work. We wish to acknowledge the valuable assistance of all those who have cooperated in this undertaking.

Borthwick to Direct Bryant Heater Personnel

P. B. Borthwick

APPOINTMENT of Paul B. Borthwick as personnel director, Bryant Heater Co., Cleveland, O., has been announced by Lyle C. Harvey, president.

T. H. Jones, a veteran of 28 years' experience in the water heater business, has been named liquefied petroleum gas specialist for the company.

Mr. Borthwick has been associated, during the past 12 years, in a personnel capacity with the Westinghouse Manufacturing Co., U. S. Rubber Co., and Osborn Manufacturing Company. He has had 25 years' experience in industrial fields and is a member of the Industrial Relations Association and the Cleveland Chamber of Commerce.

Mr. Jones served with the former Hoffman Co., Louisville, Ky., moving up through the ranks to sales engineer. He was formerly on the board of directors, Liquefied Petroleum Gas Association, as Kentucky representative and has served as advisory member on many national committees.

NEW ENGLAND MEETING

(Continued from page 43)

York, on "Fuels of the Future," are both carried in this issue of the MONTHLY.

An illuminating paper by Dr. N. K. Chaney, consultant, A. G. A. Gas Production Research Committee, showed that this is an age in which "industrial dependence upon organized research is the rule and not the exception."

The speaker showed the various responsibilities of management in respect to pure research and described the widely diversified research program undertaken by A. G. A.

"The Economic Outlook" was a talk delivered by Joseph L. Snider, pointing out the need for an adequate European recovery program consistent with the dignity of European countries.

On the subject "Markets Unlimited," John A. Robertshaw, president, Gas Appliance Manufacturers Association, discussed in detail the work of G.A.M.A. and A. G. A. in advertising and promoting the automatic gas range built to "CP" standards, and the automatic gas water heater.

Five divisional chairmen were selected by N.E.G.A.: Accounting—C. R. Prichard, Jr., Gas Service, Inc., Nashua; Industrial—Harry B. Catlett, The Hartford Gas Co., Hartford, Conn.; Manufacturers—C. H. Ackerman, C. H. Ackerman, Inc., Newton; Operating—Edwin R. Clark, Lynn Gas & Electric Co., Lynn, Mass.; Sales—John C. Willis, Brockton-Fitchburg-Springfield companies, Boston.

Norman B. Bertolette, president, The Hartford Gas Co., and N.E.G.A. past-president, was awarded special recognition because his company presented the most comprehensive annual meeting program suggestions over a ten-year period.

Hall M. Henry, director of gas operations, NEGEA Service Corp., Cambridge, Mass., and a N.E.G.A. past-president, received special recognition for contributing most to the effectiveness of the company manager conferences. During the meeting, Mr. Henry delivered a talk entitled "Highlights of High B.t.u. Gas at Cambridge."

Numerous other important figures in the gas industry were included on the program.

Reelection of Margot J. Whitmire, home service director, Springfield Gas Light Co., Springfield, Mass., as chairman, N.E.G.A. Home Service Group, was announced during the group's luncheon.

Ella Heyne, home service director, Northampton Gas Light Co., Northampton, Mass., was reelected vice-chairman. H. Dorothy Keller, home service director, Blackstone Valley Gas & Electric Co., Woonsocket, R. I., was chosen secretary-treasurer. Mrs. Gertrude Crosthwaite, home service director, Connecticut Light & Power Co., and Florence McKane, home service director, Portland Gas Co., Portland, Me., were named to the executive committee.

William E. Broeg, food consultant and author, discussed the topic "Gas Abuses," outlining a brief history of gas appliances and pointing out the importance of appliance use requirements.

Obituary

HARRY EARL TURTON, supervisor, heating engineering service division, gas commercial department, Cincinnati Gas & Electric Co., died late Thursday, February 12, at Speers Hospital, Dayton, Kentucky. He was 50 years old.

Mr. Turton has served the Cincinnati company ever since he first joined them as a gas appliance repairman in 1922. He was promoted to appliance inspector in the gas commercial department in 1925, was made a heating engineer in 1927, and supervisor, heating engineering service division, in 1939.

He is survived by his widow, Mrs. Helen Turton; his father, William N. Turton; two brothers, Arthur and Fred Turton, and a sister, Mrs. Wilbur Zingerle.

HAROLD J. LaWALL, assistant to the vice-president of operations, The United Gas Improvement Co., died in Bryn Mawr Hospital March 10 following a brief illness. Mr. LaWall was 68 years old and had been an employee of U. G. I. for 48 years.

Born in Bloomsburg, Pa., he lived in Haverford, Pa., and was a member of the American Gas Association, Pennsylvania Gas Association, and Edison Electric Institute. He was a brother of the late Dr. Charles H. LaWall, formerly president, Philadelphia College of Pharmacy and Science.

Surviving are his widow, Helen Schuyler LaWall, a daughter, Mrs. Frederick C. Geiger, Jr., and two grandchildren.

SALES OPPORTUNITIES

(Continued from page 4)

mittee we have to start with the premise that every step in the selling process is inter-related, and should be so treated in the Association's activities and in those of its member companies.

This means that for any given campaign the consumer advertising—both national and local—point of sale material—and all other promotional activities, should be planned as a whole and built around the same basic ideas.

The General Promotional Planning Committee is the custodian of the sums allocated to advertising and promotion by the industry's Promotion, Advertising and Research Committee. It's our responsibility to integrate into these programs the promotional work done by the Association's general staff and its various committees working on residential, advertising, publicity, and commercial and industrial projects. In this way, all the talents of our industry can be brought to bear on a single objective. It was such coordination that has made the "Gas Has Got It" campaign successful. It is the same type of integrated effort we plan for future programs.

Along that line the A. G. A. Water Heating Committee is planning a "warm-up" water heating campaign for 1948 (for announcement of this campaign see page 9 of this issue). With the backing of the manufacturers, the promotional organization is now at work preparing this activity. It is our hope that this campaign will be carried on at the local level by all gas utilities. Your company and mine must supply the promotional impetus and back it up with our own advertising and selling effort.

This campaign is so designed that its theme "For Hot Water Magic—Gas Has Got It," can be used at any time during 1948. By keeping interest alive in water heating, we will lead up into what is hoped will be the industry's biggest campaign in 1949. Now is the time to find out what kind of a water heater sales organization you and your dealers can put into the field and to prepare for the big job ahead.

Now to digress for a minute and discuss something that I deplore. We in the gas industry are an awfully stubborn bunch when it comes to admitting that the other fellow ever has a good idea. All of us either do or should contribute to the A. G. A.'s promotional fund as well as pay dues to the Association. We have a big stake in the success of gas appliance promotions, in terms of dollars, and in terms of the future of our business. But nevertheless every time a new industry campaign comes along a big sum of money has to be spent on selling sales managers and even top management on the idea of getting on the bandwagon and joining in an industry-wide campaign. Too much money goes into the staff function of showing gas utility people why they should cooperate and not enough into telling the consumer why he should buy. The solution for that lies pretty much in your hands.

However, some of the responsibility falls on the shoulders of those of us who are directing A. G. A. activities. We've made a start at coordinating and streamlining the organization, but we hope to do even better in the future.

In these promotional plans, I am always impressed with the fact that it isn't

Convention Calendar

1948

APRIL

5-7 •G.A.M.A. Annual Meeting, Drake Hotel, Chicago, Ill.
7-9 •A. G. A. Sales Conference, Industrial & Commercial Gas Section, Windsor, Canada
8-10 •Gas Meters Association of Florida-Georgia, Hollywood Beach Hotel, Hollywood, Fla.
8-10 •Mid-West Gas Association, Annual Meeting, Nicollet Hotel, Minneapolis, Minn.
12-14 •Joint A.G.A.-E.E.I. National Conference of Electric and Gas Utility Accountants, Hotel Jefferson, St. Louis, Mo.
13-15 •Southwestern Gas Measurement Short Course, The University of Oklahoma, Norman, Okla.
14-17 •National Restaurant Association Show, Cleveland Auditorium (A. G. A. will exhibit)
19-21 •A. G. A. Distribution, Motor Vehicle and Corrosion Conference, Hotel William Penn, Pittsburgh, Pa.
20 •New Jersey Gas Association Home Service Workshop, Newark, N. J.
22-23 •Indiana Gas Association Convention, French Lick Springs Hotel, French Lick, Ind.
28-30 •Missouri Association of Public Utilities, Hotel Jefferson, St. Louis

MAY

4-5 •A. G. A. Natural Gas Department, Rice Hotel, Houston, Texas
18-20 •Pennsylvania Gas Association, Annual Meeting, Galen Hall, Wernersville, Pa.
24-25 •A. G. A. New York-New Jersey Regional Gas Sales Conference, Westchester Country Club, Rye, N.Y.
24-26 •A. G. A. Production and Chemical Conference, Berkeley-Carteret Hotel, Asbury Park, N. J.
27-28 •Natural Gas and Petroleum Association of Canada, General Brock Hotel, Niagara Falls, Ontario

JUNE

8-11 •The Institute of Gas Engineers, London, England
9 •A. G. A. Midwest Personnel Conference, Kansas City, Mo.

JULY

June 30-July 3 •Canadian Gas Association, Annual Convention, Jasper Park Lodge, Jasper, Alberta
12-13 •Michigan Gas Association—Michigan Electric Light Association, Grand Hotel, Mackinac Island

SEPTEMBER

10 •New Jersey Gas Association, Hotel Monmouth, Spring Lake, N. J.
14-16 •Pacific Coast Gas Association, Hotel Casa del Rey, Santa Cruz, Calif.

OCTOBER

Week of October 4 •A. G. A. Annual Convention and G.A.M.A. Exhibit, Atlantic City, N. J.

how much we spend but how well we spend it that counts. It reminds me of the man who received a bill for $500 from his doctor for an appendix operation. The patient being a rather exacting person, sent back to the doctor for an itemized bill. The doctor complied and the bill then read . . . "For removing appendix—$1.00. For knowing how—$499.00."

It is the "know how" in any business that counts.

I can't sell you that "know how." You've got to get it for yourself. We can safely say, though, that with the material and services supplied by A. G. A. you can make your path a lot easier.

I can't let the opportunity pass without urging you to capitalize on the A. G. A.'s New Freedom Gas Kitchen activity. You as utilities can "certify" kitchens where such kitchens meet with certain requirements—good planning, an automatic gas range built to "CP" standards, an automatic gas refrigerator, and hot water from an automatic gas water heater. The building industry will soon need a "plus factor" to move new houses. A "certificate" placed in the kitchen of homes where the A. G. A.'s requirements have been met, will give the builder a national endorsement backed by 2½ million dollars worth of national advertising and by your own company's prestige.

Let me repeat an opinion.

We are definitely headed for a buyers' market in home appliances. It's already here in radios, expensive suits, fur coats, gas storage water heaters, and other items. Some people seem to feel that this will mean the end of prosperity, but I thoroughly disagree with such thinking. It does present us, however, with our biggest challenge.

Are we men enough to realize the importance and the immediate need for salesmanship? If we are, can we say that our sales forces are adequate and well-trained? If we can say "yes" to th question, we can meet the challeng without fear.

We don't need to find out how l the market is, nor do we need to wor about how much of that market co competition plans to take away from u We *do* need to set our sights on the jo as we see it. By planning our campaign as an industry, by integrating our effort by taking advantage of our opportun ties, and by making our selling really e fective, we can prove that the market what we make it.

I am not unmindful of the difficultie that plague the gas industry but I fe that considering the calibre of the me who direct it, these difficulties are tem porary.

In our industry we have the brains t do a job; we have the determination t achieve our objectives; we have th ability to outsell our competition. Wha we need is the realization that the tim to pitch in is NOW!

Personnel Service

SERVICES OFFERED

Gas Engineer—Graduate, long supervisory experience in all phases water gas plant production. Some by-product coke plant experience. Familiar with industrial utilization of manufactured and natural gas, propane, etc. **1567**

Gas Engineer—Broad experience in gas industry including gas production, distribution methods, estimating gas sales and production requirements. Also research on customers service, gas utilization, large volume meter testing, and load studies. Recent work has been administrative. Midwest preferred. **1569.**

Chemist—January 1948 graduate—Majored in organic chemistry with a special course in quantitative organic microanalysis. Seeks opportunity and will work hard to learn and gain experience. (20). **1570.**

Executive Engineer—Seventeen years engineering experience leading to Chief Engineer, through all departments with large, well known organizations manufacturing heating, air conditioning equipment, presses, automatic machinery and electronic equipment. Unusual ability to get along with people and get things done. Graduate M.E. Married. (33). **1571.**

Sales connection with reputable manufacturer of stoves. 18 years personal contact with utility merchandising; interested in Southern and Southwest territories. **1572.**

Gas utilization engineer with broad experience in appliance development, testing, and research desires employment with sound, progressive organization which will lead to administrative position in production. Southwest location preferred. **1573.**

Chemical Engineer—1948 graduate seeks employment, preferably in production or process design work, but will consider any other type. Married, veteran. Knows Spanish. (29) **1575.**

Operating Executive—First class education. Fifteen years' experience all phases manufactured gas. Five years' research and development during war. At present Assistant Superintendent very large blue gas plant. Eastern location preferred. **1576.**

Gas Operating Engineer some experience in manufacture and distribution of water, coal, and propane gas desires position in gas company where he can get more operating experience. Single, State licensed graduate engineer. Florida location desirable but would be interested anywhere on eastern seaboard. **1577.**

Operating **Engineer** thoroughly familiar with all phases of Water Gas, Oil Gas and Butane-air **production** and **distribution.** Technical education (Graduate Engineer) and 27 years' unusually broad experience. **1578.**

POSITIONS OPEN

Designer—Development, test and service of oil and gas furnaces. Must have engineering degree with at least five years' experience in this field. Excellent position with well-established and rapidly growing Midwestern furnace manufacturer. First letter should include experience, education, salary desired and photograph. **0518**

Graduate Engineer, capable of supervising Street Construction and Maintenance. State salary required and experience. **0520**

Assistant to **Rate Engineer** of large East Central natural gas system. Economic studies, rate negotiations, development of statistical methods, estimates of future operations. 25-35 years, willing to accept responsibility, tactful, analytical. Engineering or Business Administration College graduate or equivalent. **0521**

Gas Engineer—Preferable A. G. A. Laboratories background, for work with home appliance manufacturer in middle West. Design, testing and consulting work on gas appliances. Excellent opportunity. **0522**

Young man—**Graduate Engineer.** Experience i Natural Gas Utility Operation, Distributio Design and Planning. For Colorado Utilit 12,000 Meters. **0523.**

Appliance Instructor—Experienced in conducti school and instructing servicemen in the o eration and maintenance of all domestic an industrial Gas Appliances. Salary commens rate with experience and ability. Please fu nish references and full particulars regardin education, qualifications and other person data necessary for proper appraisal. **0524.**

Man for **sales** on special gas pressure contro equipment; primarily a salesman with suf cient background in heavy distribution wor who could be trained to handle the engineer ing work in the field. Considerable road wor now with the idea of later becoming sale manager. **0525.**

Superintendent of high pressure natural ga transmission system in Northern California Requires experience with ability to direct fiel forces in operation and maintenance of hig pressure pipe lines including meters, regula tors and controls; also office personnel pe forming dispatching, accounting, meter cal culations, etc. Prefer applicant 30-40 years with some college education or equivalent. Write, stating personal history, previous ex perience, and salary expected. **0526.**

Pacific Northwest Gas Utility has an opening for a **mechanical** or **chemical engineer** for a position as maintenance engineer in oil-ga and water-gas plant. Position will require work in plant under production superintend ent. Mechanical and structural drafting and design experience necessary. Will be require to prepare equipment maintenance schedule and supervise their execution. Prefer man wit at least five years gas plant maintenance en gineering experience. Apply, giving full par ticulars as to age, education, experience and salary expected, in first letter. **0527.**

Accountants—Texas Eastern Transmission Cor poration is assembling a staff for purpose o reclassifying properties and desires applica tions from Accountants having experience i pipe line property accounting. Please write t Personnel Department, P.O. Box 1612, Shreve port, Louisiana.

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